Information Circular 83-2

NEW BRUNSWICK'S MINERAL INDUSTRY 1982

by
Staff, Mineral Resources Division

Mineral Resources Division
Department of Natural Resources
Province of New Brunswick

1983

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Mineral Resources Di··ision
Department of Natural Resources
Province of New Brunswick
Hon. Gerald S. Merrithew, Minister

1983

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PREFACE

This is the sixth in a series of reports on the Mineral Industry of New Brunswick. The information contained within the report, which is not contained in our normal series of reports, will serve as a historical record of exploration, development, mining, and government activities as well as related matters that have taken place within the Province during 1982.

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CHAPTER 1. INDUSTRIAL ACTIVITY

VALUE OF PRODUCTION

Despite substantial decreases in the prices of zinc and lead, preliminary information indicates that the value of minerals produced in New Brunswick declined by only 2.6 per cent, from the record high of $532.3 million in 1981 to $517.5 million in 1982. Slight decreases in the value of metals mined were offset by increases in the value of industrial minerals and mineral fuels produced. The value of construction materials was close to the 1981 figure of $39 million. On a province by province basis, New Brunswick, in 1982, ranked first in the production of antimony and bismuth, second in peat and lead, third in silver and zinc, and fifth in copper.

The preliminary value of zinc, lead, copper, antimony, silver and gold produced in 1982 totalled $432,629,000, down from $452,580,000 in 1981 (See Tables 1 and 2). Part of this decline was due to the fact that only a small amount of antimony was sold from inventory at the Lake George property of Consolidated Durham Mines and Resources.

The value for non-metallic or industrial minerals totalled $21,017,126 in 1982, an increase of $4.3 million over the 1981 figure. Production was realized from three limestone quarries, one silica quarry, fourteen peat operations, and by-product acid from the lead smelter. Salt was obtained from underground exploration and development work at two potash properties.

New Brunswick has a variety of mineral fuels including coal, oil and natural gas. In 1982, the value of production was $24,571,000 million, up slightly from the final 1981 figure of $23,325,535.

Despite a sluggish construction industry, the value of sand, gravel, cement, clay products and stone totalled $39,270,000, only a slight decrease from the 1981 value.

Mining is New Brunswick's fastest growing industry. On the basis of projects planned or in progress, the 1980's should witness continued growth and diversification. The value of minerals produced should exceed $1 billion by 1990. Mining is becoming a major employer, and the industry should provide more than 7,000 direct jobs by the end of the next decade. New capital in mines, concentrators and smelters, as well as in mineral-based manufacturing, could exceed $1 billion during the same period. (Figure 1)

EMPLOYMENT

During 1982 the total number of direct employees at producing mines and quarries was approximately 5,663. Although

Table 1

Mineral Production
New Brunswick
1982

PRELIMINARY ESTIMATE

	Units	Quantity	$ Value
METALS			
Antimony	kg	----------	2,956,000
Bismuth	kg	115,000	697,000
Copper	kg	12,851,000	25,000,000
Gold	g	201,000	2,989,000
Lead	kg	81,840,000	59,261,000
Silver	kg	243,000	76,310,000
Zinc	kg	247,360,000	265,416,000
			432,629,000
NON-METALLICS			
Gypsum	tonne	10,000	52,000
Peat	tonne	111,000	12,819,000
Quartz	tonne	----------	1,400,000
Salt	tonne	----------	911,126
Sulphur in Smelter Gas	tonne	85,000	5,835,000
			21,017,126
FUELS			
Coal	tonne	500,000	24,500,000
Natural Gas	m^3	2,000,000	42,000
Petroleum Crude	m^3	1,000	29,000
			24,571,000
STRUCTURAL MATERIALS			
Clay Products		----------	2,200,000
Cement		----------	13,066,000
Lime		----------	3,944,000
Sand and Gravel	tonne	6,100,000	9,635,000
Stone	tonne	2,500,000	10,425,000
			39,270,000
GRAND TOTAL 1982 (PRELIMINARY)			517,487,126

Table 2

The Mineral Production of New Brunswick

1956 to 1982

Date Calendar Year	Metals	Non-Metallics	Fuels	Structural Materials	Total
1956	$ 337,234	$ 744,262	$ 8,155,040	$ 9,021,766	$ 18,258,302
1957	4,789,658	951,178	8,424,346	9,056,683	23,221,865
1958	1,114,700	944,321	6,964,888	8,576,845	17,600,754
1959	------	941,330	8,533,822	8,636,080	18,111,232
1960	------	1,101,722	8,834,749	7,136,268	17,072,739
1961	------	1,379,335	7,686,695	9,738,355	18,804,385
1962	3,483,969	1,571,082	6,900,984	9,855,540	12,811,575
1963	9,255,246	1,224,450	7,352,023	10,511,700	28,343,419
1964	29,648,079	1,099,685	8,573,688	9,355,260	48,676,712
1965	62,461,357	1,742,662	8,742,980	9,210,353	82,158,352
1966	69,386,294	1,894,992	8,005,535	10,934,416	90,221,237
1967	67,957,099	2,427,150	7,568,509	12,465,932	90,418,690
1968	69,622,942	2,915,246	7,436,931	8,476,317	88,451,436
1969	77,562,887	3,603,831	5,757,473	7,668,374	94,592,565
1970	89,939,781	2,785,381	3,086,033	8,979,360	104,790,555
1971	91,049,256	2,902,648	4,038,971	9,242,071	107,232,946
1972	98,772,724	3,820,526	3,552,863	14,024,867	120,170,980
1973	132,797,907	4,243,694	3,434,416	23,701,754	164,177,771
1974	184,142,991	5,742,863	5,441,537	21,255,701	216,583,092
1975	197,230,888	6,252,923	7,473,197	20,965,912	231,922,920
1976	195,340,976	7,163,466	5,988,243	30,090,493	238,583,178
1977	238,583,350	10,037,550	6,333,791	34,439,352	289,394,043
1978	281,770,379	11,467,716	8,811,135	37,670,743	339,719,973
1979	419,123,591	11,658,369	10,394,844	38,510,412	479,687,216
1980	327,457,000	12,978,716	17,282,186	45,684,000	374,129,479
1981	452,580,000	16,666,976	23,325,535	39,769,000	532,341,511
1982 (P)	$432,629,000	21,017,126	$24,571,000	$39,270,000	517,487,126

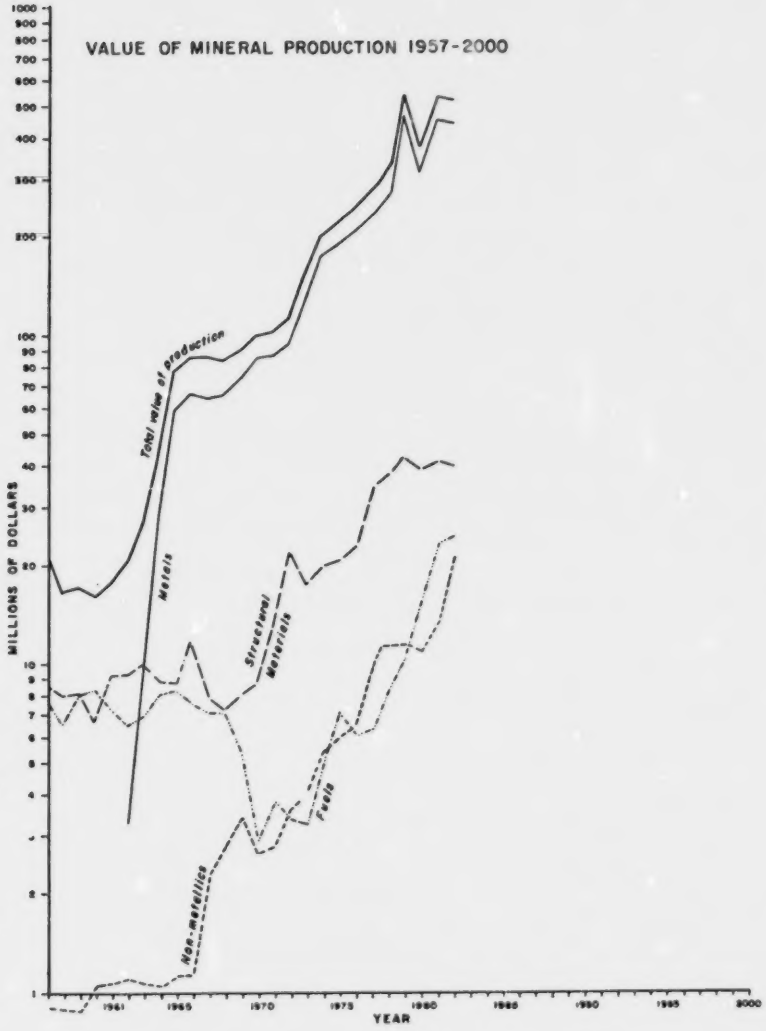

Figure 1. Value of mineral production 1957-1982

it is difficult to determine exactly how many people are employed in exploration it is believed that during 1982 the number was significantly reduced from several years earlier when it was estimated that close to 600 people were engaged in geological, geophysical and geochemical surveys, exploration drilling, analytical laboratories and with land surveyors. Scientific, technical and administrative staff employed by the Provincial Government in support of mineral resource development totalled thirty-nine.

MINING AND DEVELOPMENT

The non-renewable resource producers in New Brunswick are shown in Figure 2. Metal mines in production during the year included Brunswick Mining and Smelting Coporation Ltd. (No. 6 and No. 12 deposits) and Heath Steele Mines Ltd. These three mines all in the northern part of the Province, were able to offset low metal prices by substantial increases in productivity, a credit to the management and staff of these operations. A shutdown at Heath Steele in October due to poor market conditions was averted by the offer of assistance from the Premier of New Brunswick, the Hon. Richard B. Hatfield. The No. 6 and No. 12 mines and lead smelter of Brunswick Mining and Smelting Corporation Ltd. sustained operations throughout 1982 with improved productivity and overall operating efficiencies.

A small amount of gold and silver was produced from gossan ore at the Anaconda Caribou deposit west of Bathurst.

The decision by Brunswick Mining and Smelting to proceed with a $360 million 100,000 tpy zinc reduction plant was reconsidered in light of changing economic conditions and the project was put on hold until the economic climate changes.

Consolidated Durham Mines and Resources remained closed in 1982.

Final stages of development work was underway at what promises to be New Brunswick's newest metal mine, the Mount Pleasant tungsten deposit of Billiton Canada Limited, in northern Charlotte County. Annual production is expected to be 1800 tons of tungsten concentrate and 600 tons of molybdenum concentrate. About 275 people will be employed when the mine is in full production.

Development work continued at the Potash Company of America (PCA) mine near Sussex with commercial production expected to commence in the summer of 1983. A $40 million storage-loading facility is under construction at Saint John to handle most of the potash produced. Total capital invested in the PCA mine and shipping facility is close to $200 million, with about 300 direct jobs created. Underground exploration at the Denison-Potacan project southwest of Sussex was completed in 1982, and a production decision is expected early in 1983. Some 575 construction jobs will be created, with permanent employment in the 400 range. New capital invested in the Province by Denison for

mine, concentrator, transportation and storage facilities will exceed $250 million.

Coal production at the Grand Lake operation of N.B. Coal Ltd. was 498,480 tonnes in 1982. This compares to a production of 518,344 tons in 1981. Virtually the entire production is sold to the New Brunswick Electric Power Commission's thermal plants. Under a recently adopted coal policy the exploration development rights for areas with coal potential are offered on a regular basis, with N.B. Power having a 60-day right of first refusal. An area released under this policy and comprising 15,093 ha, was taken up by N.B. Power in early 1982. A second area was released in late 1982. The Stoney Creek oil and natural gas field near Moncton is currently owned by Irving Oil interest of Saint John. Besides a small amount of crude oil, natural gas from this field is provided to customers in the Moncton-Hillsborough area.

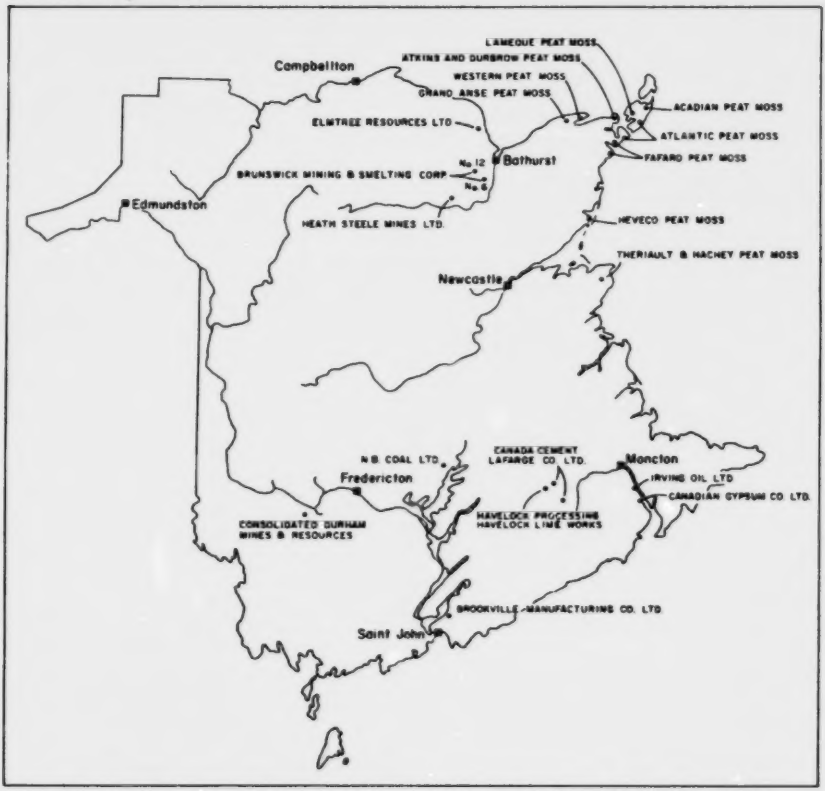

Figure 2. Non-renewable resource producers in New Brunswick 1982

Operations at the Canada Cement plant near Havelock, continued intermittently during the year with some decline in production due to soft markets. The limestone operations of Havelock Lime Works, Elmtree Resources Limited and Brookville Manufacturing Limited were sustained throughout 1982. Chaleur Silica Limited provided quartz flux for the lead smelter at Belledune.

Major aggregate producers, i.e. Brunswick Ready Mix Limited, Acadia Crushed Stone Limited, Moncton Crushed Stone Company Limited, Forbes and Sloat Limited, Diamond Construction Limited, MacDonald Paving and Construction Limited and Brookville Manufacturing Company Limited were in full production during the year. Nelson Monuments Limited, the Province's major producer of ornamental stone continued production during 1982 using stone imported from Ontario.

EXPLORATION

Exploration activity in New Brunswick (Figure 3) declined considerably in 1982, particularly in comparison with the previous three years. The Bathurst-Newcastle area continued to receive attention from a number of companies and individuals. Although zinc, lead and copper were the main minerals sought, some attention is being directed to the gold potential of the area. Brunswick Mining and Smelting Corp. Ltd. and Billiton were the main companies active, with the latter busy on a number of prospects in the southern part of the Province.

The value of assessment work received in 1982 totalled $4.8 million (Figure 4). In addition to this value $8.2 million was reported for oil and natural gas exploration and $7.4 million was spent in potash exploration. The total value for exploration was in excess of $20.4 million.

Denison-Potacan Potash Co. continued exploration in the Salt Springs area and a third area with potash potential, also near Sussex, was explored by BP Canada Limited. Although 10 holes have been drilled, it is too early to determine if the company will decide to sink a shaft and initiate an underground exploration programme.

New silica and limestone deposits were discovered in the southern and northern parts of the Province during 1982. It is anticipated that one of these limestone deposits will be in production in 1983.

A promising new gold discovery was made near Saint John by a prospector, and a large number of claims subsequently staked nearby. Tungsten, tin, base metals and gold attracted some interest in the southwestern part of the Province. PetroCanada started exploration work on their bituminous shale property near Memramcook, and no major expenditures were incurred on the Canadian Occidental holdings near Albert Mines. Seismic work was continued in this part of the Province by Chevron-Irving, with about 1000 km completed by year end. These companies also drilled a test well near Salisbury.

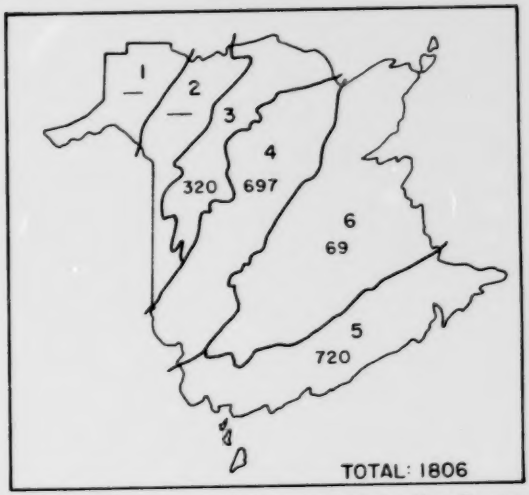

Figure 3. Number of claims staked in New Brunswick by metallogenic region in 1982

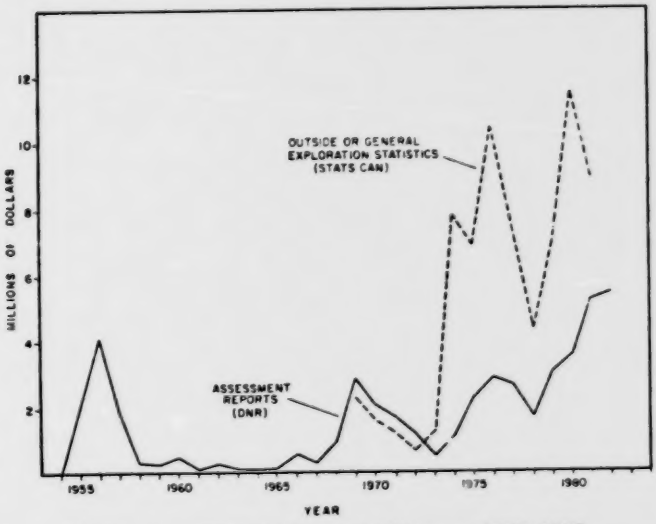

Figure 4. Exploration expenditures 1955-1982

CHAPTER 2. GOVERNMENT ACTIVITY

The year 1982 saw the completion of work funded under the Minerals and Fuels Sub-agreement. This year's work was an extension of a project begun during the $11.3 million, 5-year agreement and represented the final wrap up of all projects undertaken (Figure 5).

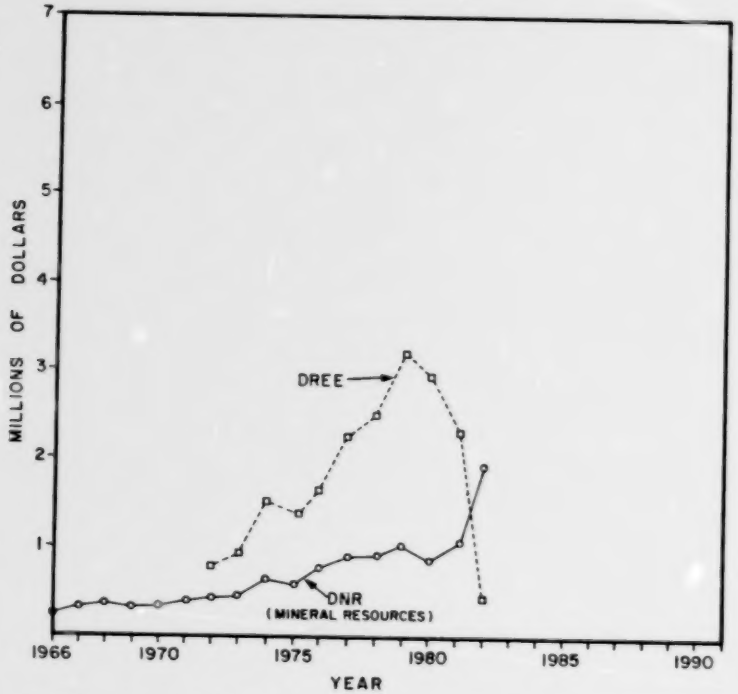

Figure 5. Budget of Mineral Resources Division 1966-1982

PROGRAMS

A variety of projects were carried out by Mineral Resources for the purpose of providing an inventory of the province's mineral resources in order to assist industry, government and the general public in the management and orderly development of these resources.

Preparation of maps and reports related to the inventory of the Province's peat resources continued and follow-up work on the RFC sulphation roast technology was carried out, together with special studies on coal desulphurization and shale oil extraction. A program to encouarge prospecting, and to make the public more aware of New Brunswick's mineral industry, was expanded in 1982. A panel display was circulated to various centres throughout the province during the year.

New Brunswick has established an effective mining tax rate. Producing metal mines are subject to a fixed tax rate of 16 per cent plus a two per cent net revenue tax, making the marginal rate about 54 per cent. The manufacturing rate in New Brunswick is 48 per cent. Brunswick Mining and Smelting and other companies are taking advantage of incentives introduced in the Mining Income Tax Act of 1977. Under this Act, 25 per cent of the cost of approved process research expenditures can be deducted from the tax payable. Effective April 1, 1982, exploration expenditures in the province may be deducted at a rate of $1.50 for every $1.00 spent.

New Brunswick's Mining Act is also being revised, and comment was solicited from various associations affected by this legislation.

Reclamation guidelines were finalized early in 1982, and will be applied to all mines and quarries in the province. They were developed in consultation with industry and with the departments of environment and agriculture, and regulations are now being drafted. Mines, quarries, concentrators and processing plants are also subject to Canada and New Brunswick environmental standards with respect to air and water quality.

Figures 6 and 7 give the location of projects carried out respectively under Provincial and Federal-Provincial sponsorship.

MINERAL RESOURCES DIVISION

Organization:

The Mineral Resources Division is one of five divisions of the Department of Natural Resources (see Figure 8). Mineral Resources consists of two branches--the Geological Surveys Branch and the Mineral Development Branch, and two sections--Administration and Mineral Lands (see Figure 9).

ADMINISTRATION SECTION

The operating budget for the Mineral Resources division for the fiscal year 1982-83 amounted to $1,929,100, which represented a 65.6 per cent increase over the previous year. This amount breaks down as follows: 58 per cent personal services, 28 per cent other services, 11 per cent materials and supplies and 3 per cent property and equipment. Table 3 presents a historical

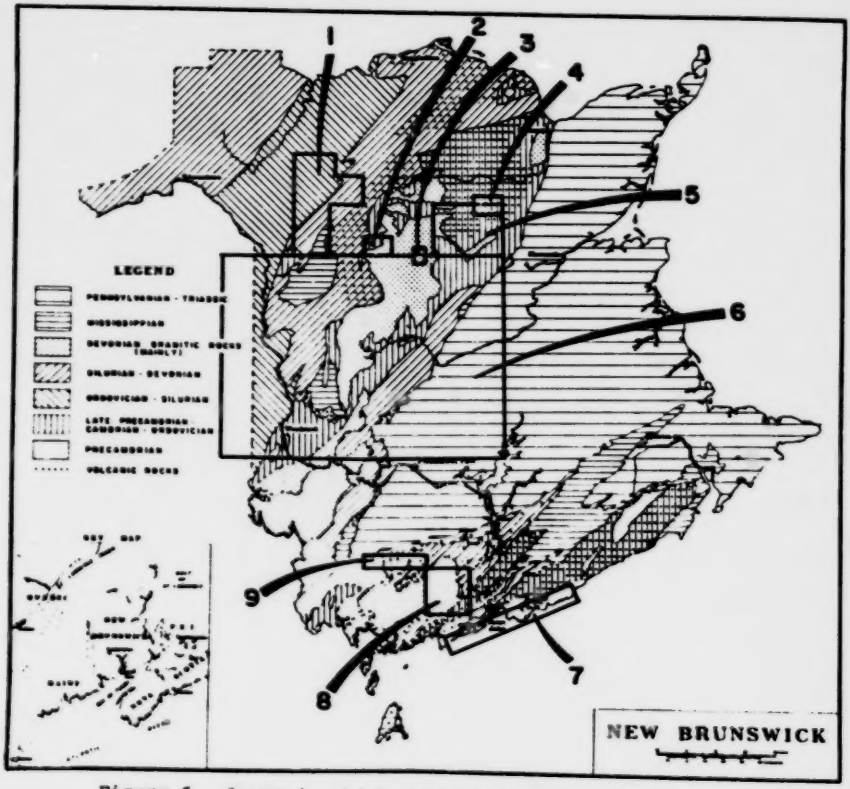

Figure 6. Areas in which Geological Survey Branch projects were carried out in 1982

1. Geochemical silt sampling
2. Geological revision - K-11 area
3. Geology, gravity and seismic surveys of the Miramichi earthquake area
4. Geological mapping - O-9 area
5. Geological mapping 21 O/1 area
6. Geology of 21 J area
7. Assessment of gold potential in southern New Brunswick
8. Eastern St. George Batholith project
9. Geology of Mount Pleasant Caldera

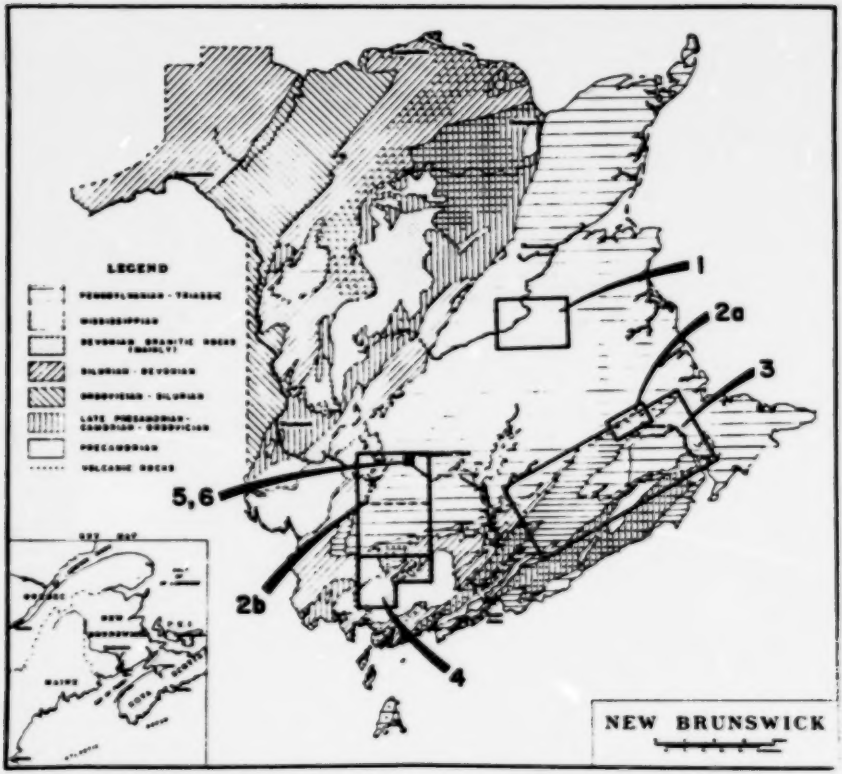

Figure 7. Areas in which Mineral Development Branch projects were carried out in 1982

1. Granular aggregate resources. Blackville map-area
2a. Industrial mineral study Havelock area
2b. Gravity survey
3. Albert Formation mapping project
4. Granular aggregate resources - McDougall Lake (21 G/7) map area
5. Peat Inventory
6. Coal-oil shale combustion research

review of expenditures, staff and revenue. Details of the staffing of the Mineral Resources Division are given in Figure 8, Figure 9 and Table 4.

The large increase in total budget was due to GDA staff transferring to the Provincial budget. The Province decided to carry on some of the projects previously funded under the GDA agreement.

The section is staffed as follows: Wayne Carr, Administrative Services Officer; Sandra Devenney, Administrative Services Officer; Carol LeBlanc, Clerical Officer; Shelley Stephens, Receptionist at Fredericton; while Freda Kelly, Clerk-Typist and Sharon McKinnon, Administrative Services Officer, are in Sussex and Bathurst respectively.

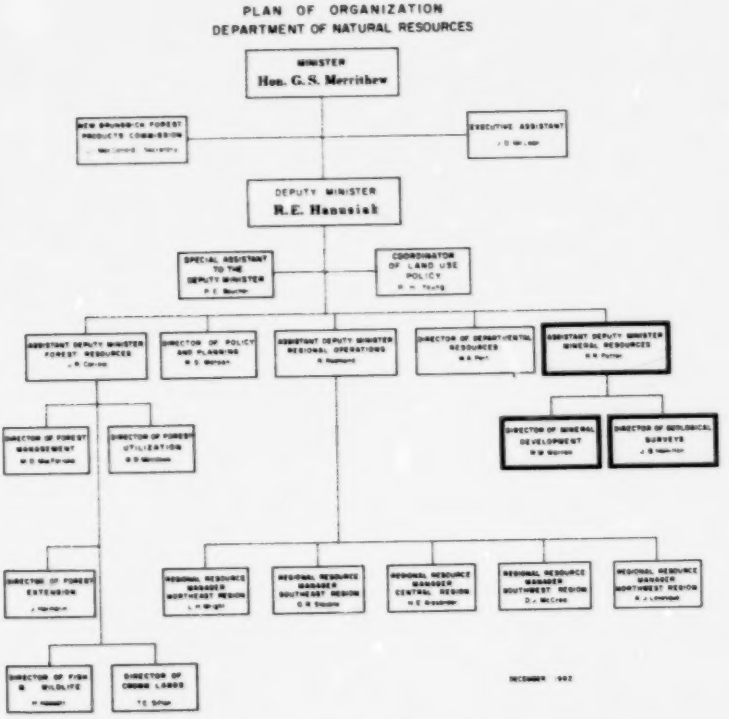
PLAN OF ORGANIZATION
DEPARTMENT OF NATURAL RESOURCES
MINISTER
Hon. G.S. Merrithew
EXECUTIVE ASSISTANT
DEPUTY MINISTER
R.E. Hanusiak
SPECIAL ASSISTANT TO THE DEPUTY MINISTER
COORDINATOR OF LAND USE POLICY
ASSISTANT DEPUTY MINISTER FOREST RESOURCES
DIRECTOR OF POLICY AND PLANNING
ASSISTANT DEPUTY MINISTER REGIONAL OPERATIONS
DIRECTOR OF DEPARTMENTAL RESOURCES
ASSISTANT DEPUTY MINISTER MINERAL RESOURCES
DIRECTOR OF FOREST MANAGEMENT
DIRECTOR OF FOREST UTILIZATION
DIRECTOR OF MINERAL DEVELOPMENT
DIRECTOR OF GEOLOGICAL SURVEYS
DIRECTOR OF FOREST EXTENSION
REGIONAL RESOURCE MANAGER NORTHEAST REGION
REGIONAL RESOURCE MANAGER SOUTHEAST REGION
REGIONAL RESOURCE MANAGER CENTRAL REGION
REGIONAL RESOURCE MANAGER SOUTHWEST REGION
REGIONAL RESOURCE MANAGER NORTHWEST REGION
DIRECTOR OF FISH & WILDLIFE
DIRECTOR OF CROWN LANDS

Figure 8. Plan of organization, Department of Natural Resources

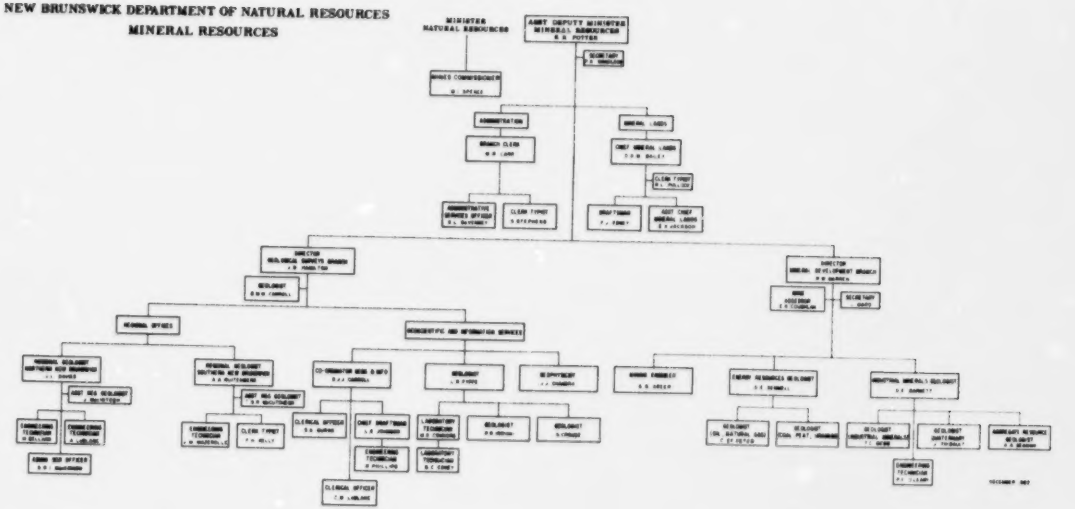

Figure 9. Plan of organization chart, Mineral Resources Division

Table 3

Mines Division
Expenditures, Staff, Revenue 1964-1982

YEAR	PROV. PROJECTS(1)	EXPENDITURES					STAFF			REVENUE
		ADMIN.	TOTAL(2)	DREE PROJECTS(3)	TOTAL(1)&(3) PROJECTS	TOTAL(2)&(3) EXPENDITURES	PERMANENT	CASUAL	TOTAL	TOTAL REVENUE
1964-65							20			364,877
1965-66						274,663	24			908,502
1966-67						329,292	26			563,404
1967-68						381,478	27			278,464
1968-69						341,671	28			292,257
1969-70						321,162	25			417,949
1970-71	75,110					626,289	27	13	40	319,278
1971-72	136,170	294,151	430,321	367,953	504,123	798,274	27	13	40	303,030
1972-73	129,702	319,582	449,284	455,389	585,091	904,673	29	13	42	233,525
1973-74	197,700	405,614	603,314	923,705	1,121,406	1,527,020	29	13	42	592,550
1974-75	128,127	470,027	598,154	786,158	914,285	1,384,312	30	13	43	2,165,711
1975-76	166,348	614,054	780,402	844,190	1,010,538	1,624,592	30	13	43	2,561,458
1976-77	203,048	706,469	909,517	1,347,114	1,550,162	2,256,631	30	13	43	863,888
1977-78	241,796	746,938	988,734	1,508,004	1,749,800	2,496,738	29	14	43	1,135,828
1978-79	147,201	916,212	1,063,413	2,167,640	2,314,841	3,231,053	30	1'	43	3,040,492
1979-80	125,421	672,358	797,779	1,493,886	1,619,307	2,291,665	36	12	48	10,736,752
1980-81	241,974	725,921	967,895	1,387,844	1,629,818	2,355,739	36	12	48	8,141,862
1981-82	263,715	900,935	1,164,650	1,401,048	1,664,763	2,565,698	36	13	49	7,887,661
1982-83	744,943	1,181,079	1,92t,022	473,035	1,217,978	2,399,060	43	4	47	5,553,900

This was the seventh operating year of the Minerals and Fuels Subagreement. Budgeting for this programme and its projects is the work of a steering committee, however budget control, purchasing and staffing is the responsibility of the Mineral Resources Division, Administration Section. Funding for GDA programmes is controlled by the Community Improvement Corporation and is provided on an 80-20 basis by the Federal and Provincial governments respectively.

	Spending Level	Expenditures	Differences (Over) or Under
Primary 3	$1,113,300.00	$1,224,842.94	($111,542.94)
Primary 4	541,900.00	586,567.19	(44,667.19)
Primary 5	212,400.00	80,008.11	132,391.89
Primary 6	61,500.00	34,603.87	26,896.13
Total	$1,929,100.00	$1,926,022.11	$3,077.89

We were overspent in Primaries 3 and 4 but underspent in Primaries 5 and 6 which represented an underexpenditure of $3,077.89.

The total expenditures for the Mineral Resources Division, including GDA budgets, is as follows:

Budgets	Vote	Expenditures	
Minerals & Fuels	40	$268,188.43	
	58	63,687.04	
Sub-Total			331,875.47
Developing Regions	40	$141,163.04	
Sub-Total			141,163.04
Total GDA			$473,038.51
Provincial Budget	19	1,926,022.11	
Sub-Total			1,926,022.11
GRAND TOTAL		$2,399,060.62	$2,399,060.62

NOTE: Vote 40 is for ordinary account under GDA agreements while Vote 58 is for Capital Expenditures under GDA agreements. Vote 19 is the ordinary account for Provincial Budgets.

Table 4

Staff - Mineral Resources Division

Year	Mines or Mineral Development						Mineral Resources or Geological Surveys						
	Admin	Geologist Mining Eng	Tech	Steno Secty	Draft	Total	Admin	Geologist Mining Eng	Tech	Steno Secty	Draft	Total	Total Division
1953-54	1	1	1	3	-	6							6
1954-55	2	1	1	4	-	8							8
1955-56	4	-	3	6	2	15							15
1956-57	4	-	3	8	2	17							17
1957-58	5	1	2	9	2	19							19
1958-59	5	1	2	9	2	19							19
1959-60	5	1	4	10	1	21							21
1960-61	5	1	3	10	1	20							20
1961-62	5	1	2	10	2	20							20
1962-63	5	1	2	11	2	21							21
1963-64	5	1	2	10	2	20							20
1964-65	5	2	2	9	2	20							20
1965-66	5	6	3	8	2	24							24
1966-67	5	8	3	8	2	26							26
1967-68	2	-	3	-	-	5	3	9	1	7	2	22	27
1968-69	2	-	3	-	-	5	3	10	1	7	2	23	28
1969-70	2	-	3	-	-	5	3	7	1	6	3	20	25
1970-71	3	-	2	-	-	5	3	7	4	5	3	22	27
1971-72	3	-	2	-	-	5	3	7	4	5	3	22	27
1972-73	3	-	3	-	-	6	3	8	4	5	3	23	29
1973-74	3	-	3	-	-	6	3	8	4	5	3	23	29
1974-75	3	-	3	-	-	6	4	8	3	6	3	24	30
1975-76	3	-	4	-	-	7	4	8	2	6	3	23	30
1976-77	3	-	4	-	-	7	4	8	2	6	3	23	30
1977-78	4	-	6	-	-	10	2	8	2	4	3	19	29
1978-79	2	-	5	-	-	7	4	9	3	5	3	24	31
1979-80	-	-	-	-	-	-	4	13	6	8	3	34	34
1980-81	-	-	-	-	-	-	8	13	6	8	3	38	38
1981-82	2	6	1	1	-	10	6	8	7	6	2	29	39
1982-83	5	8	1	3	1	18	5	9	6	4	1	25	43

INCLUDES MINERAL LANDS

MINERAL LANDS SECTION

The Mineral Lands Section processes and maintains records pertaining to the disposition of Crown-owned minerals. Mining claims are recorded and prospecting licences are sold at Fredericton and at the Regonal Offices at Bathurst and Sussex.

The Mineral Land staff consists of D.D.W. Bailey, Chief Administrative Services Officer; E.V. Jackson, Administrative Services Officer; Fred Edney, Draftsman; and Mrs. Rhonda Pollock, Clerk Typist III.

Tables 5 and 6 present mineral lands statistics and exploration statistics for 1982.

Table 5
Mineral Lands Statistics for 1982

	No.	Claim Equivalent	Hectares	% Increase over previous year (decrease)
Prospecting Licenses Sold	346			(25.8)
Claims Recorded	1,801		29,155	(64.8)
Claims Renewed	12,332		199,630	(9.3)
Claims Expired	6,668		107,942	53.5
Claims Converted		889	14,391	135.8
Licences Renewed		10,629	172,062	2.3
Licences Expired		194	3,140	304.2
Potash Leases in Effect		1,734	28,074	0
Other Leases in Effect		397	6,427	0
Total claims or claim equivalents in effect		27,782	449,734	(13.0)
Oil-Gas Licences	50	75,027	1,216,234	0
Oil-Gas Lease	1	133	2,157	0
Bituminous Shale Licences	1	1,777	28,776	0
Bituminous Shale Permit	1	89	1,439	0
Bituminous Shale Leases	0			
Underground Storage Licences	0			
Underground Storage Leases	0			
Quarry Permits	215		87	(-16.6)
Quarry Leases	5		255	0
Peat Licences	4	70	1,085	(27)
Peat Leases	19	517	8,374	12

Table 6

Exploration Statistics - 1982

Assessment Reports Submitted 115

Holes Drilled	Number	Meters Drilled	Value ($)
Reported for assessment	147	31,730	1,864,824
Potash exploration	53	9,407	2,592,703
Oil and gas	1	1,835	1,300,000
Oil Shale Exploration	3	963	180,000

Value of Exploration reported	
Assessment (metallic minerals)	4,842,000
Potash	7,420,000
Oil and gas	7,964,000
Oil shale	230,000
Total exploration	20,456,000

GEOLOGICAL SURVEYS BRANCH

The Geological Surveys Branch is composed of the director's office and two sections: Regional Offices and Geoscientific and Information services. The director is John B. Hamilton.

Bathurst Regional Office

The Bathurst Regional Office staff consists of J.L. Davies, Regional Geologist; J.A. MacIntosh, Assistant Regional Geologist; Sharon McKinnon, Administrative Officer; Maurice Belland, Technician; and André LeBlanc, Technician.

PROGRAMMES Geological mapping was carried out in 1982 by R.R. Irrinki and G. Crouse in the Big Bald Mountain map area (21 O/1). Both Irrinki and Crouse had previously mapped parts of the area during a DREE sponsored accelerated mapping program (1970-75). The results will be published on a scale of 1:50,000.

J.A. MacIntosh continued his work on the map area (O-9) (one quarter mile = one inch), and at time of writing, he believes the work will be finished in late 1982.

J.L. Davies conducted geological mapping in the towns and villages of Rogersville, Rexton, St. Louis de Kent, St. Antoine, St. Quentin and St. Francois de Madawaska. The surficial geology was mapped by A.A. Seaman. This work fulfilled a request from the New Brunswick Department of Municipal Affairs.

Stream silt geochemical surveys were carried out in two areas in 1982, (1) Riley Brook 21 O/3 (west half) and (2) Sisson 21 O/6. The Riley Brook area was sampled by Water Management Surveys at a cost of $23,450 and the Sisson area was sampled by Precise Surveys at a cost of $26,323. Approximately 350 heavy mineral samples were obtained during these surveys, to test their usefulness in exploration for uranium, gold, tungsten and tin deposits.

Analyses of the stream silt collected in 1981 in the Serpentine Lake area (21 O/2) and parts of 21 O/6, 21 O/11, 21 O/10, and 21 O/9 are now complete and should be published in the spring of 1984.

Maurice Belland is continuing his compilation of geological, geochemical and geophysical data in the Miramichi Zone. His work is augmented by field work directed by J.A. MacIntosh.

CORE STORAGE The core storage library at Madran was completed in mid summer 1982. Over 100,000 feet of core has now been put into the building that is designed to hold approximately 190,000 feet. Core was received in 1982 from the Newmont Mining Company (Norland property), Placer Development (Portage Lakes property), and Brunswick Mining & Smelting Corporation (Sabina Option). Billiton Canada Limited submitted 25,000 feet from the Restigouche Zn-Pb-Ag deposit.

OTHER ACTIVITIES Compilation and revisions of previously published maps continued. New edition of "quarter mile" geology maps will be available in 1982. Geology map K-11 (scale one quarter mile = one inch) was revised and published, and was incorporated in a new 1:50,000 geology map of the Serpentine Lakes area (21 O/2). The 1:50,000 map also served as a base map for silt geochemical data mentioned above. New 1:50,000 geology maps covering the Nepisiguit Lakes and Nepisiguit Falls areas are in preparation.

As in past years the Regional Geologist reviewed forestry plans for northern New Brunswick (three forest regions), so that conflicts between forestry and mineral exploration can be avoided. No serious problems were encountered in 1982.

Prospecting courses, sponsored by the Federal Development of Regional Economic Expansion (DREE) and the N.B. Mineral Resources Division were conducted in English and French in Bathurst, and in English in Chatham, J.L. Davies and J.A. MacIntosh were the instructors.

Field trips were conducted for several individuals and groups including one associated with IGCP Project 27 (The Caledonide Orogen) and sponsored by the NATO ADVANCED STUDY INSTITUTE.

PUBLICATIONS

Davies, J.L. and L. Fyffe, 1982. Field Trip Guidebook "B". Sulphide deposits of the Bathurst area, N.B. IGCP Project 27. NATO Advanced Study Institute. 45 p.

Fredericton Regional Office

The Fredericton Regional Office operated at a reduced level during the year. B.M.W. Carroll acted as Assistant Regional Geologist.

PROGRAMMES The major activities within the office during the year, in addition to supplying exploration-related data to companies and individuals, consisted of work related to the provision of sample identification and limited analytical services to the general public. The production of mineral occurrence reports and updating of mineral occurrence files, the editing and publication of Division reports, the organization of an Annual Review of Activities, etc.

A summary of stratigraphic names in use in New Brunswick was prepared by L.R. Fyffe for the "Lexicon of Canadian Stratigraphy, Volume VI, Atlantic Canada" to be published by the Canadian Society of Petroleum Geologists as part of an 8-volume set.

PUBLICATIONS

The following work was published during the year:

Fyffe, L.R., 1982. Geology, Woodstock area (21 J). New Brunswick Department of Natural Resources, Mineral Resources Division. Map NR 4 (scale 1:250,000).

Fyffe, L.R., 1982. Taconian and Acadian structural trends in central and northern New Brunswick. In Major structural zones and faults of the northern Appalachians, edited by P. St. Julien and J. Beland, Geological Association of Canada, Special Paper 24.

Fyffe, L.R., 1982. Geology in the vicinity of the 1982 Miramichi Earthquake. N.B. Dept. of Natural Resources, Mineral Resources Division. Open File Report 82-27.

St. Peter, C., 1982. Geology of Juniper-Knowlesville-Carlisle area (I-16, I-17, I-18), N.B. Dept. Natural Resources. Map Report 82-1.

Venugopal, D.V., 1982. Geology of upper part Becaguimec, Keswic and Nashwaak Rivers-Cloverdale-Millville map areas (I-19, J-19, J-20), N.B. Dept. Natural Resources, Mineral Resources Division. Map Report 82-2.

Sussex Regional Office

The Sussex Regional Office staff consists of A.A. Ruitenberg, Regional Geologist; S.R. McCutcheon, Assistant Regional Geologist; M.R. Mazerolle, Engineering Technician, and Freda H. Kelly, Clerk-Typist. Roger D. Thomas of Terrain Analysis and Mapping Services Ltd. was hired on contract to conduct a

heavy mineral survey and to identify surficial deposits in the Eastern St. George Batholith.

PROGRAMMES AND PROJECTS S.R. McCutcheon started an investigation of the Mount Pleasant Caldera. The objective of the investigation was to resolve stratigraphic problems in the Shin Creek-Mount Pleasant area and thus provide a reliable basis for mineral exploration.

R.D. Thomas of Terrain Analysis and Mapping Services conducted a heavy mineral survey and identified surficial deposits overlying the Eastern St. George Batholith. V.N. Rampton advised on the interpretation of surficial units and C.F. Gleeson on heavy mineral analysis. A.A. Ruitenberg designed the project and assisted with identification of till lithologies.

The heavy mineral concentrates were analyzed for tin, tungsten and gold. Samples collected from the B horizon were analyzed for Cu, Pb, Zn, Mo, Ag, U, and Sb. Additional samples taken from L, H, A, and B horizons are being analyzed for plant nutrients by the Maritime Forest Research Centre Laboratory in Fredericton. The plant nutrient analyses together with lithologic compositions of the tills, soil, texture and drainage will be used as aids to determine the forest potential of the ground.

A gold potential survey in the coastal area of southern New Brunswick was begun. An extensive gold-bearing, hydrothermally altered zone was delineated at Cape Spencer, east of Saint John, by Mr. Morton Gordon, in 1982. In the gold potential survey, the gold-bearing rocks at Cape Spencer were mapped in detail and reconnaissance survey was carried out in the Musquash-Black River area.

A.A. Ruitenberg continued co-operation with H. van Groenewoud, of the Maritime Forest Research Centre, on a long term project to determine the relationship of forest growth with soil-geologic and climatic parameters in New Brunswick. A joint report on a productivity oriented forest site classification system for New Brunswick was published by the Maritime Forest Research Centre of Environment Canada.

In addition to these major investigations, a variety of activities were carried out by the office staff. These include: preparing reports on the bedrock, surficial and environmental geology of the Village of North Head and the Town of St. Andrews, preparing field trip guides and leading field trips, giving talks and papers, compiling and preparing descriptions of Carboniferous lithostratigraphic units for Lexicon of Maritime Stratigraphy, and providing consulting services to exploration companies and the public.

PUBLICATIONS

The following abstracts and publications were released:

McCutcheon, S.R., 1982. Windsor Group evaporites in southern New Brunswick: an example of deep water - deep basin deposition. Abstract, Geological Association of Canada Meeting, Winnipeg, Manitoba.

——, 1982. A stratigraphic guide to potash exploration in the Windsor Group of southern New Brunswick. Abstract, Canadian Institute of Mining and Metallurgy Third Meeting, District 1, Fredericton.

——, 1982. Potash in the Central New Brunswick Platform. Abstract, Canadian Institute of Mining and Metallurgy, 84th Annual General Meeting, Quebec.

——, McLeod, M.J., and Ruitenberg, A.A., 1982. The Avalon Zone in southern New Brunswick. In Field Guide for Avalon and Meguma Zones, IGCP Project 27, edited by A.F. King. Published by Department of Earth Sciences, Memorial University of Newfoundland, pp. 277-284.

Ruitenberg, A.A., 1982. Predictive metallogeny in granitoid intrusions of the New Brunswick Appalachians. Abstract, Geological Association of Canada Meeting, Winnipeg, Manitoba.

——, 1982. Metallic mineral zonation related to tectonic evolution of the New Brunswick Appalachians. Abstract, International Geological Correlation Meeting, Fredericton, New Brunswick.

——, 1982. Regional setting of tungsten-molybdenum, tin, and antimony deposits in New Brunswick. Abstract, Canadian Institute of Mining and Metallurgy Third Meeting, District 1, Fredericton.

——, and Fyffe, L.R., 1982. Mineral deposits associated with granitoid intrusions and related subvolcanic stocks in New Brunswick and their relationship to Appalachian tectonic evolution. Canadian Institute of Mining and Metallurgy, V. 75, pp. 83-97.

——, and McCutcheon, S.R., 1982. Acadian and Hercynian structural evolution of southern New Brunswick. In P. St. Julien and J. Beland editors: Major structural zones and faults of the northern Appalachians, Geological Association of Canada, Special Paper 24, pp. 132-147.

——, ——, 1982. Tungsten-molybdenum, tin, antimony deposits in New Brunswick. Field Guide, published by Department of Earth Sciences, Memorial University of Newfoundland, 30 p.

——, ——, 1983. Geology of gold-bearing rocks, Cape Spencer area. Mineral Resources Division, New Brunswick Department of Natural Resources, Plate 83-29.

Van Groenewoud, H. and Ruitenberg, A.A., 1982. A productivity oriented forest site classification system for New Brunswick. Maritime Forest Research Centre. Canada Department of the Environment, Report M-X 136, 9 pp.

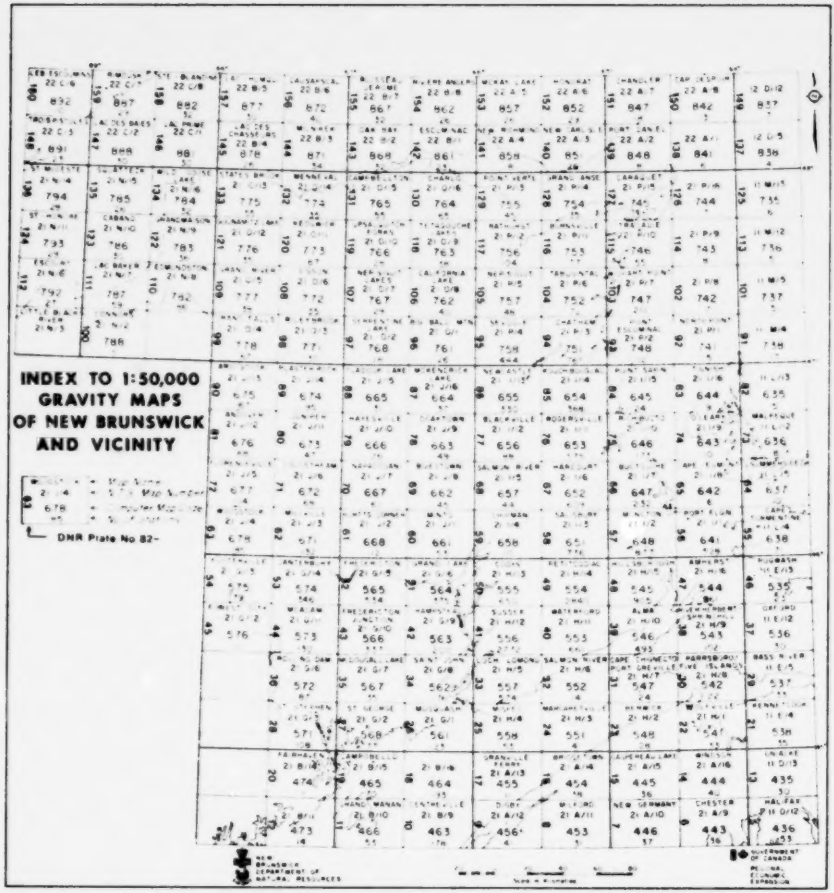

Figure 10. Index to 1:50,000 Gravity Maps of New Brunswick and Vicinity

Figure 11. Field investigations in the vicinity of the Miramichi earthquake

Geophysics

GRAVITY SURVEYS Gravity surveying was continued in the southern extremity of the Central Carboniferous Basin. In particular, the Fredericton Junction and Fredericton (1:50,000 scale) areas were covered (see Figure 10). This program was conducted jointly with Tim Webb. A gravity survey was also conducted in the Miramichi Earthquake region. This project was undertaken with the assistance of K.B.S. Burke of the University of New Brunswick. The results of the survey have provided some understanding of the area in terms of structure, depths and shapes of the poorly exposed geologic units. Modelling studies are presently underway in determining probable causes or mechanisms for the recent quakes (Figure 11).

SEISMIC SURVEYS Refraction seismic surveys were conducted at several Strong Motion Accelerometer (S.M.A.) sites in the Miramichi Earthquake epicentral region.

GEOTHERMAL STUDIES Three 400 m drill hole locations in the Pokiok and St. George granites and in the southern portion of the Central Carboniferous Basin were selected in cooperation with the Geothermal section of the Earth Physics Branch (EMR). It is proposed that the holes will be cored and geophysically logged for geothermal heat gradients. Cost of the drilling and logging is borne by Earth Physics Branch and field-managed by John Leslie and Associates.

Modelling studies of the sites will be undertaken by D.N.R. and will involve ground heat data, magnetics and gravity.

GRAVITY COMPILATION All gravity data gathered by D.N.R., the Earth Physics Branch, the University of New Brunswick and the private sector were combined to make up a comprehensive network of 22,671 gravity stations. The combined data set has been compiled in a series of 1:50,000 maps covering all of New Brunswick and includes sheets for the Northumberland Strait, Bay of Fundy and adjacent parts of Quebec and Nova Scotia (Figure 10).

As part of the compilation program, modelling studies were completed on the following gravity anomalies associated with salt: Smithtown, Salina, Salt Springs, Millstream, Plumweseep, Penobsquis, Five Points, Portage Vale, Anagance and Pointe de Bute.

Listings of all 22,671 gravity stations are available by map-sheet on paper or as a whole on magnetic tape.

SATELLLITE IMAGE ANALYSIS Work commenced on the interpretation of Landsat imagery of the southern portion of the Central Carboniferous Basin and the Pokiok and St. George granites. The objectives of the study were to create a linear map of the area and the detection of potential sites for salt, sulphide minerals, and aggregate material.

Some training areas used were the Consolidated Durham Mines, Mount Pleasant, St. Stephen nickel deposit and the Blagdon gravel operation at Welsford.

CONSULTATION Services were provided to various engineering, exploration and mining companies active in the area. Field assistance was also given to local prospectors.

Considerable time was spent with visiting geophysicists and geologists from Ottawa and the United States. Work involved mapping earthquake activity in the Holmes Lake-Indian Lake area.

Geochemistry

The geochemistry section is staffed by Denise Connors, Engineering Technician (resigned in December 1982) and Bettina Edney, Laboratory Assistant. The position of geochemist which became vacant last year has not been filled.

Laboratory analysis (A.A. and colormetric determinations) were carried out for Cu, Pb, Zn, Mn, Fe, Co, Ni, Ag and Mo on 1,160 field samples collected in the Serpentine Lake map-area (21 O/2), 1,740 samples collected in map areas J-5, J-6, J-7, L-6, K-6, M-5 and M-6, and 360 samples collected in the Popple Brook area.

Geoscientific and Information Services

The GeoScientific and Information Services Centre is staffed by D.J.J. Carroll, Co-ordinator; G. Johnson and Ron Phillips, Drafting Section; Mrs. S. Burns, Publication Section; and Ms. C. LeBlanc, Assessment file-microfiche section.

Some of the activities carried out by the Centre in 1982 included the following:

A. The coordination of nine 10-week Prospecting Courses.

These courses, conducted by A.W. Lockhart, J.L. Davies, and J. MacIntosh were held in Fredericton, Saint John, Chatham and Bathurst. The Bathurst courses were offered in both French and English. A total of 117 individuals registered for the course, bringing the total of 159 registrants since the inception of the course in January of 1981. In order to familiarize the students with some of the principles taught in the prospecting course, field trips were conducted by Dr. A.A. Ruitenberg and J. MacIntosh.

B. Microfilming of the Mineral Resources Division's mineral exploration assessment files was continued and copies were deposited in our regional offices and several public libraries by the year's end.

C. The indexing and coding of all incoming mineral exploration assessment file reports for inclusion in the national bibliographic data file called Geoscan continued. This data base is operated and coordinated by the Geological Survey of Canada and receives input from several provincial and other organizations as well as from New Brunswick. Because the G.S.C. was involved in a change of operating and data base management systems for Geoscan in 1982, the New Brunswick portion of the data base was not updated with the 1982 coded assessment data.

D. During the past year several requests were received for the loan of audio-visual products that promoted, publicized, and/or demonstrated some aspect of our province's geological history and Brunswick Mining and Smelting Corp. Ltd. borrowed the Mineral Resource Division's panel display for exhibit purposes. Several schools in New Brunswick, Nova Scotia and Maine received on loan the Department's movie entitled "The Awakening Giant".

Requests for mining-geological related subjects by newspapers, freelance writers, government agencies and corporations for photographs were also responded to in the past year.

Revenue generated within the GeoScientific and Information Services Centre through the sales of maps, reports and facsimile publications amounted to $22,586.00.

MINERAL DEVELOPMENT BRANCH

The Mineral Development Branch is composed of the Director's office and three sections, Energy Resources, Industrial Minerals and the Mining Engineer. The director was R.W. Warren.

Energy Resources

The staff of Energy Resources includes D.E. Gemmell, Energy Resources Geologist and Clinton St. Peter, Geologist.

Projects in coal, oil and gas, uranium, peat, oil shales and other related areas have been carried out.

URANIUM The province continued analysis of stream sediments for uranium in the north-central portion of the province.

OIL AND NATURAL GAS Monitoring of the Stoney Creek Field and an 815 km seismic program by Chevron Irving continued, along with minor studies of the potential for oil and natural gas throughout the province (Fig. 12).

PEAT The field work in the peatland survey was completed which covered some 140,000 hectares of peatlands throughout the entire province. The maps are being finalized and computer programs developed to handle the entire 20,000 plus data points. There were continued requests for peatland leases for development purposes by the private sector.

Figure 12. Chevron-Irving exploration drill hole, Middlesex, New Brunswick

OIL SHALES The oil shale policy was developed and areas put up for bid on a work bonus basis. There were 29 requests for the tender document and 2 bids received. Petrocan was the highest bidder on Block #1 and was awarded the licence to search. PetroCan carried out field studies and drilled 3 holes. Clinton St. Peter carried out a field investigation in the Moncton Sub-basin.

Further field work was carried out on oil shale by R.P.C., under contract to the Department of Natural Resources, on fluidized bed combustion work on oil shales and coal-oil shale mixtures.

PIPELINE AND UNDERGROUND STORAGE Numerous committees worked on both aspects with regard to the TOM pipeline proposal.

Industrial Minerals

The Industrial Minerals staff consists of Donald E. Barnett, Industrial Minerals Geologist; Tim C. Webb, J.J. Thibault and A.A. Seaman, Geologists; Paul C. O'Leary, Engineering Technician; and Diane Blair, Secretary. Two summer students were also employed for the duration of the field season.

AGGREGATE RESOURCE INVENTORY The program of granular aggregate resource mapping and evaluation was continued in 1982. Mapping was carried out in and around the areas of Blackville (21 I/12) and MacDougall Lake (21 G/7) at a scale of 1:50,000 (Figure 13).

QUATERNARY GEOLOGY Work continued on the compilation of the Quaternary geology originally started in 1981. The work is being carried out by Dr. Vern Rampton of Terrain Analysis and Mapping Services Ltd. and is being funded in 1982 by the Geological Survey of Canada.

The study involves the compilation of all published surficial geological data as well as field visits to "marry" the various authors' geological units. The results will be published in report form together with a map at a scale of 1:500,000. Completion is expected in 1983 with the map being published in advance.

GRAVITY Gravity surveying continued in the southern extremity of the Central Carboniferous Basin with the objective of determining possible target areas for salt-potash exploration. The program covered the Fredericton Junction (21 G/10) and Fredericton (21 G/15) map sheets at a scale of 1:50,000.

POTASH Continuing programs of monitoring potash developments at Potash Company of America (Plumweseep), Denison-Potacan Potash Company (Salt Springs) and BP Exploration Canada Ltd. (Millstream). This work involved evaluation of four drill holes completed by BP together with Denison-Potacan's underground exploration program.

LIMESTONE An evaluation of limestone resources in the Havelock basin commenced in late 1982. This work, which is to continue in 1983, involves a detailed analysis of the geology,

reserves and land ownership affecting future limestone extraction. All drill hole data is being compiled at a 1:10,000 scale.

CROWN AGGREGATE MANAGEMENT Management of aggregates in Crown lands continued under the Quarriable Substances Act.

A total of 215 quarry permits were issued during the year, representing a decrease of 16 per cent over the previous year. Quarry leases to Brunswick Mining and Smelting Corporation Ltd. and Acadian Granite Ltd. continued in effect during 1982. Inspections were made throughout the year to ensure that regulations under each quarry permit or lease were adhered to. A total of 1.67 million tonnes of sand and gravel were removed from Crown lands in 1982 with a royalty value of $244,700. This royalty reflects an increase from $0.10 to $0.15 per tonne which was effective January 1, 1982.

A representative continued to sit on the Land Management Advisory Committee to provide information for the orderly development and management of Crown lands. Numerous reports on the aggregate potential of lands involved in Crown land exchanges were prepared throughout the year.

PUBLICATIONS

The following publications were released in 1982.

Lavergne, C. and Hunter, M., 1982. Granular Aggregate Resources of Riley Brook (21 O/3), Plaster Rock (21 J/14) and Tuadook Lake (21 J/15). N.B. Department of Natural Resources, Mineral Resources Division, Open File Report 82-1.

Hunter, M. and Lavergne, C., 1982. Granular Aggregate Resources of Coldstream (21 J/6), Napadogan (21 J/7), Hayesville (21 J/10) and Juniper (21 J/11). N.B. Department of Natural Resources, Mineral Resources Division, Open File Report 82-2.

Lavergne, C. and Hunter, M., 1982. Granular Aggregate Resources of Newcastle (21 I/13), Doaktown (21 J/9) and McKendrick Lake (21 J/16). N.B. Department of Natural Resources, Mineral Resources Division, Open File Report 82-3.

Hunter, M. and Lavergne, C., 1982. Granular Aggregate Resources of Fosterville (21 G/13) and Canterbury (21 G/14). N.B. Department of Natural Resources, Mineral Resources Division, Open File Report 82-4.

Seaman, A.A., 1982. Granular Aggregate Resources of McAdam (21 G/11) and Forest City (21 G/12). N.B. Department of Natural Resources, Mineral Resources Division, Open File Report 82-14.

Thibault, J., 1982. Granular Aggregate Resources of Rollingdam (21 G/6) and St. Stephen (21 G/3). N.B. Department of Natural Resources, Mineral Resources Division, Open File Report 82-15.

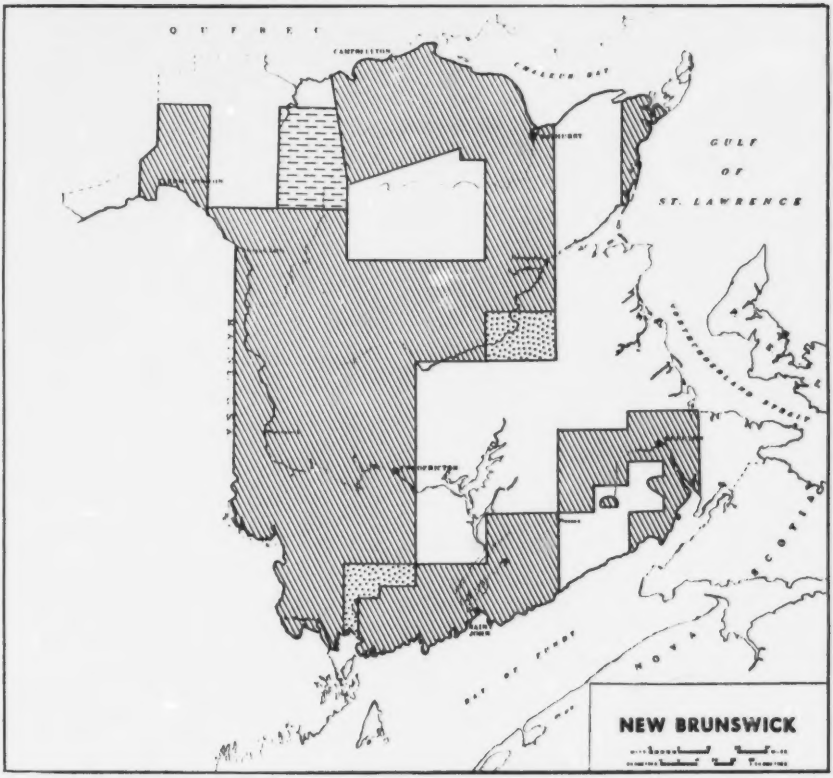

Figure 13. Map showing progress of granular aggregate resource mapping in New Brunswick

Reclamation (G.J. Greer)

Several mining companies submitted reclamation plans in 1982 and these were reviewed by the Departments of Natural Resources, Agriculture and Environment. Vegetation establishment on the mine tailings has received considerable attention during recent years and it has been recognized that a high degree of technical and scientific expertise is needed in order to ensure a successful reclamation program. A number of reclamation plans were approved by the Minister during the year. In addition, a Committee to develop a strategy for the reclamation of the Minto-Chipman strip-mined lands was formed by the Deputy-Minister in September, 1982.

MINING COMMISSIONER'S REPORT

The issues resolved by the Mining Commissioner are of a sensitive and time-consuming nature and concern conflicts that inevitably arise during the acquisition, exploration, and development of mineral rights authorized under mining law.

It is our policy to attempt to prevent these conflicts before they get to the dispute stage, at which time dispute procedures, as laid down in the Mining Act, are followed.

Although in recent years the majority of cases have involved land damage claims due to mining operations, such issues as claim staking infractions, boundary disputes, and right of entry invariably occur from time to time, and regarding which the Mining Commissioner must be prepared to deal with. Ensuing obligations involve telephone consultation, correspondence, contacts and interviews with aggrieved parties.

Matters of concern referred to the Mining Commissioner were as follows:

The Mining Act
Ch. M-14. RSNB 1973

Dunbar vs. Hitchcock - land damage - Mining Licence 1243 cancelled for noncompliance

Steeves vs. Keddy, Vacon and Meyer - for Keddy's claims - extension of time to perform assessment work subject to settlement of damage claim with land owner

Hunter vs. Gordex Minerals Ltd. - road construction on private property by mining company

Canada Cement LaFarge Ltd. vs. Acorn Farms - conflict - surface vs. mineral rights

Oil and Natural Gas Act
Ch. O-2.1 Acts of N.B. 1976

Chevron Standard Ltd. vs. Jean and Percy Waddy - application for a "Special Order" granted subject to compensation for damages

to be determined by the Property Compensation Board, pursuant to section 10 of the Oil and Natural Gas Act

Chevron Standard Ltd. vs. Fred, Susan and Lane Waddy - application for a "Special Order" granted subject to the matter of compensation being determined by the Property Compensation Board in accordance with section 10 of the Oil and Natural Gas Act

The Mining Commissioner became involved for the first time in 1982 in hearing applications for "Special Orders" under section 10 of the Oil and Natural Gas Act. This is the result of Chevron Standard Ltd. conducting geophysical tests, under licence to the Department of Natural Resources, in their search for hydrocarbons in the Moncton Basin. This work entails traversing many properties that are privately held and the company is obliged to make arrangements with the individual land owners for the right to enter upon their private land.

In conclusion, the Mining Commissioner served on two committees during the calendar year of 1982:

(1) the Ad Hoc Committee on Mining Legislation, and

(2) the Planning Committee for the 39th Conference of Provincial Mines Ministers.

The Mining Commissioner was also designated by the Minister of Natural Resources to conduct hearings into two applications for a Special Order to enter upon private lands in accordance with the provisions of the Oil and Natural Gas Act.

CHAPTER 3. METALLIC MINERALS

In 1982 metallic production was recorded from two producers: Brunswick Mining and Smelting Corporation Limited and Heath Steele Mines Limited.

PRODUCING MINES

BRUNSWICK MINING AND SMELTING CORPORATION LIMITED

Brunswick operates two mines, No. 6 and No. 12, a concentrator and a lead smelter.

LOCATION The Brunswick No. 12 mine is located about 15 miles west of Bathurst in Gloucester County at Lat. 47°28.5'N and Long. 65°53.5'N. The Brunswick No. 6 mine is located about 18 miles southwest of Bathurst and about 6 miles south of No. 12 at Lat. 47°24.3'N and Long. 65°49.5'W. The concentrator that treats ore from both mines is adjacent to No. 12 mine. The lead smelter is located at Belledune Point about 30 miles in a direct line from No. 12 mine.

HISTORY The presence of sulphides was noted in 1907. Rediscovery in 1952 by drilling of electromagnetic targets located the No. 6 mine. Investigation of other electromagnetic targets on strike pinpointed a target for drilling at the site of No. 12 mine in 1953. The property was granted to Brunswick Mining and Smelting which was controlled by St. Joseph's Lead Company. During the period 1953-57 an open pit and pilot mill were constructed at the No. 6 location. In 1961 interest transferred to M.J. Boylen, K.C. Irving and Patino Corporation. Development commenced at No. 12 in 1962 and the mine commenced production in 1964. Production was reached at No. 6 mine in 1966. In 1967, Noranda invested $50 million and gained control. A proposed $50 million expansion undertaken in 1974 was completed in 1981. During the years 1979 to 1981 nearly $69 million in capital expenditures were made at the mine and smelter.

COMPANY

Head Office - P.O. Box 45, Commerce Court W., Toronto
Mine Office - P.O. Box 3000, Bathurst
Smelter Office - P.O. Box 2000, Bathurst

OFFICERS

President - J.A. Hall
Vice President, Mining - J.W. Moerman
Vice President, Smelting - A. Young

EMPLOYEES

Mine - 1,723
Smelter - 602

RESERVES (Dec. 31, 1982)

	Tonnes (000)	% Zn	% Pb	% Cu	g. Ag/tonne
No. 12 Mine					
Proven	54,734	9.12	3.69	0.29	96
Probable	44,008	9.08	3.78	0.36	98
No. 6 Mine					
Proven	176	5.65	2.03	0.46	69

	Tonnes	Copper	Lead	Zinc	Silver (g)
Tonnes and Grade to Mill					
No. 12 Mine	3,534,750	0.31	3.64	9.04	102
No. 6 Mine	98,750	0.15	3.15	8.62	94
	3,633,500	0.30	3.55	8.90	100
Tonnes and Grade Concentrate Production					
Copper Conc.	26,653	21.22	8.08	4.03	3,109
Lead Conc.	216,826	0.58	33.86	6.65	491
Zinc Conc.	458,374	0.23	1.92	51.63	88
Bulk Conc.	78,802	0.75	20.44	30.54	366
Tailings	2,852,845	0.08	1.09	1.81	39
Recovery %					
In Copper Conc.		51.54	1.63	0.32	22.34
In Lead Conc.		11.47	55.78	4.39	28.71
In Zinc Conc.		9.65	6.70	72.18	10.95
In Bulk Conc.		5.38	12.23	7.33	7.78
Tailings		21.96	23.66	15.78	30.22
Smelter Production					
Lead (tonnes)	60,800				
Silver (kilograms)	98,700				
Acid (tonnes)	179,700				

DEVELOPMENTS, 1982 Record production level with the first complete year at the expanded rate of 10,000 tonnes per day. The mineral exploration program was continued throughout the Province with $2.1 million expended during the year. A decision was taken not to proceed with the zinc reduction plant at this time as it is not economic at forecast prices and markets for zinc.

OUTLOOK The outlook is for a surplus of mine capacity over metal demand in 1983. Although the company has no control over commodity prices, they are committed to be more productive and cost effective. The exploration program will continue in efforts to add to ore reserves.

HEATH STEELE MINES LIMITED

LOCATION The Heath Steele Mine is located 32 miles northeast of Newcastle in Northumberland County at Lat. 47°17'N and Long. 66°05'W.

HISTORY Discovered in 1954 by airborne E.M., mining began in 1957 but shut down between 1958 and 1962 because of low metal prices and poor recoveries. Reopened in 1962 with a contract to treat the Wedge ore in part of the concentrator. Production capacity was increased from 1,600 tons to 3,000 tons per day in 1970 and to 4,000 tons in 1977. New production shaft (No. 5) was completed to a depth of 2,915 feet in 1976.

COMPANY Heath Steele Mines Limited is owned by Noranda Mines (75%) and Asarco (25%). President is R.C. Ashenhurst. Mine Manager is Jim Johnstone.

PRODUCTION Concentrator capacity is 4,000 tons per day. 1982 results are as follows:

	Tons	Copper	Lead	Zinc	Silver (oz.)
Short Tons and Grade to Mill	1,542,220	0.99	1.45	3.97	1.68
Concentrate Production (short tons and grade)					
Copper Conc.	43,942	20.01	7.13	5.00	11.41
Lead Conc.	42,959	2.61	23.75	5.06	17.17
Zinc Conc.	95,822	0.99	1.38	49.06	2.88
Tailings	1,359,497	0.32	0.57	0.72	0.80
Recovery %					
In Copper Conc.		57.93	14.02	3.59	19.31
In Lead Conc.		7.39	45.66	3.55	28.40
In Zinc Conc.		6.25	5.91	76.88	10.63
Tailings		28.43	34.41	15.98	41.66

Ore Reserves (Dec. 31, 1982)

	Tons (000)	% Zn	% Pb	% Cu	oz. Ag /ton
Indicated	25,247	4.26	1.42	1.24	1.73
Inferred	2,125	4.11	1.36	1.30	1.82

DEVELOPMENTS, 1982 The company sustained losses during the year and in July announced that operations would close indefinitely in October, 1982. An agreement was reached with the Province whereby the Province would subsidize the company losses over and above the cost of care and maintenance for a period of six months and to a maximum of $3 million. The mine continued normal production until April 30, 1983 without cost to the Province under the agreement.

OUTLOOK Commodity prices and markets are to be reviewed in November, 1983 and if the situation is economic the mine

will reopen. In the interim a gossan pile with gold and silver values will be treated by a cyanide leach for recovery of the precious metals. Exploration program planned to cost in the neighbourhood of $2 million will be carried out during 1983.

PROPERTIES IN DEVELOPMENT STAGE OR INACTIVE

CARIBOU DEPOSIT 21 O/9W
Restigouche County, New Brunswick

LOCATION About 25 miles west of Bathurst (Lat. 47°34'N; Long. 66°17.6'W).

HISTORY Discovered in late 1955 by Anaconda Copper Mining Company through regional geological mapping using aeromagnetic maps and photo interpretation. Ground EM pinpointed drill target. Mining of secondary (near surface) copper took place between November, 1970 and November, 1971. Metallurgical problems caused shutdown. Production resumed September, 1973-September, 1974. Extractive metallurgy research on Pb, Zn, Cu ore continuing.

COMPANY Caribou-Chaleur Bay Mines Limited, 260 - 8th Street, Toronto, Ontario, M8V 3E1. President: R.L. Sinclair. Mine Manager and Vice President: A. Buzas (resigned). Anaconda Canada Ltd. 67.5%, Cominco Limited 22.5%, Chaleur Bay Syndicate 10.0%, Caribou-Smith M.L. (east part of sulphide body), controlled by Anaconda Canada Ltd.

PROPERTY AND DEVELOPMENT Held under mining licence. Anaconda excavated an adit in late 1950's and in late 1960's and early 1970's an incline was driven from adit. Coincidentally a 1,000 ton/day mill and copper concentrator was constructed.

PRODUCTION Secondary copper ore produced.

	tons mined (open pit)	av. grade Cu
November 1970-September 1974	910,000	3.4%

FINANCIAL Caribou-Chaleur - 3,000 million shares
Caribou-Smith - 3,000 million shares

RESERVES

Tons	Zn %	Pb %	Cu %	Ag oz/ton
49,400,000	4.48	1.7	0.47	1.71

(probably a smaller tonnage with higher grade (25,000,000)

DEVELOPMENTS, 1982 Company's aims: 1) Get a better handle on their reserve's down dip. This has been accomplished by deep drilling in 1981 (according to the Company); 2) Find the most practical mining method. The method under consideration is the so-called vertical crater retreat (VCR). This method is being used in a 50,000 ton test stope; 3) Improve the recovery of

zinc and lead minerals from the extremely fine-grained pyritic, in part secondary enriched ore. The pilot plant testing is scheduled to end in early 1982; 4) Study the environmental aspects of their mine operation. This includes finding a suitable tailings disposal area, removing old structures for run-off control, and relocating and processing a stockpile of ore, gossan, and waste. Small amounts of gold and silver will be recovered before the material is graded and revegetated. In 1982, approximately 32,000 tonnes of gossan grading 0.2 oz/ton Au, and 8 oz/ton Ag were leached with cyanide, yielding 5,320 oz Au and 53,000 oz Ag. Recovery of Au and Ag is estimated to be 80% and 50% respectively. The process is temperature sensitive, hence is only feasible in the warmer months. It is expected that an additional 2,000 to 4,000 oz Au and 100,000 oz Ag will be extracted in 1983. This will presumably exhaust the extractable Au and Ag. The feasibility study on the Zn-Pb-Ag sulphides is continuing.

OUTLOOK Depressed metal prices will keep this deposit on the "back burner". Extractive problems with primary ore have not been solved satisfactorily.

CHESTER MINE 21 O/1E

Northumberland County, New Brunswick

LOCATION Approximately 45 miles west of Newcastle (Lat. 47°06'N; Long. 66°13.9'W). Accessible via Highway 430 and secondary roads.

HISTORY Discovered by Kennco Canada Exploration in 1955 and sold to Chesterville Mines Limited in early 1960's. Acquired by Sullivan Group in late 60's.

COMPANY Chester Mines Limited (100% owned by the Sullivan Mining Group Ltd.); 2500 - 500 Place d'Armes, Montreal, Quebec, H2Y 2W6. President: J.J. Beauchemin

PROPERTY AND DEVELOPMENT Held under mining licence (5,379 acres) - 138,000 feet of diamond drilling carried out, a decline to over 1,200 feet constructed in 1975. Water treatment plant begun in 1974.

RESERVES AND GRADE

	Type	Tons x 10^6	Zn %	Pb %	Cu %
Open Pit	probable	1.6	2.12	0.83	0.63
	probable	3.30			0.82
Underground	probable	3.80			1.58
	probable	9.20			0.44

OUTLOOK Deposit will be mined when copper prices improve.

PROBLEMS Mine water could be a problem. Clearwater Stream runs near the orebodies; drains to South Sevogle River. A site selection for a concentrator could present problems.

LAKE GEORGE ANTIMONY — 21 G/14E
York County, New Brunswick

LOCATION The Lake George antimony mine is situated about nine miles north of Harvey Station, York County.

HISTORY Antimony sulphide was first discovered on the property in 1863. There was minor production between 1880 and 1884. The first major development that led to production occurred in 1969-71.

COMPANY F.D. Corman is president and Bertin Bourgoin is the Mine Manager of Consolidated Durham Mines and Resources Ltd.

PROPERTY AND DEVELOPMENT Detailed drilling has been mainly concentrated around the present mine workings. An inclined shaft provides access to the ore zones.

EMPLOYEES The company has reduced staff to key employees.

PRODUCTION

	Tons mined - short	Average grade	Concentrate produced - metric tons	Avg. % of Antimony in Concentrate	Lbs. of Antimony Concentrate
1981	39,420	3.54%	2,480	66.37%	3,628,755
1980	99,530	3.09%	3,463	66.86%	5,104,498
1979	110,415	3.58%	4,337	65.67%	6,279,001
1978	103,576	3.50%	3,880	65.58%	5,609,669
1977	100,780	3.85%	3,896	65.94%	5,663,723
1976	90,270	4.34%	4,361	65.97%	6,342,591
1975	83,825	3.95%	3,463	66.13%	5,048,765
1974	55,111	5.23%	3,733	65.67%	5,404,545

FINANCIAL In June, 1982, the company had working capital of $4,644,946 and net loss of $614,482.

RESERVES AND GRADE

	Short Tons	
1981		
1980	2,500	3.00%
1979	119,803	3.59%
1978	302,691	3.44%
1977	412,648	4.22%
1976	483,465	4.56%
1975	527,333	5.06%
1974	178,763	4.60%

DEVELOPMENTS, 1982 The mine was allowed to flood and no exploration work was carried out. Prior to flooding, all underground equipment was retrieved and reconditioned, the mill was revamped and modifications of the headframe, hoist and shaft were carried out.

OUTLOOK Prior to closing the mine, an antimony ore zone was found in the downward extension of the Hibbard vein, between the 800 and 1,400 foot levels. This zone contains 853,175 tons of ore grading 4.15% Sb using a 1.5% cut-off grade. In addition, low-grade tungsten minerals and gold were intersected in several drill holes. It is expected that the shaft will be deepened and mining will resume when market conditions for antimony improve.

MOUNT PLEASANT TUNGSTEN DEPOSIT 21 G/7W
Charlotte County, New Brunswick

LOCATION The Mount Pleasant property is situated about 30 miles northeast of St. Stephen, Charlotte County.

HISTORY The first mineral showings and a geochemical anomaly were discovered in 1954. A tin-base metal orebody was discovered in 1962 and a large tungsten-molybdenum-bismuth orebody in 1969. The property is presently managed by Billiton Canada Ltd.

COMPANY Dr. J.W.G. Gilbey is president of Billiton Canada Ltd.

PROPERTY AND DEVELOPMENT The property has been extensively explored by diamond drilling (335,000 feet) and adits. During 1982 construction continued at the mine site (Figure 14).

EMPLOYEES During 1982, mining and construction crews were employed by contractors involved in underground work, mill and mine building construction.

PRODUCTION POSSIBILITIES Production will commence in 1983. About 1,800 tons of tungsten oxide and 600 tons of molybdenum di-sulphide will be produced per year.

FINANCIAL The Sullivan Mining Group has spent about $9 million and the former owner, Mount Pleasant Mines Ltd., invested about $3 million in development of the property. The cost of putting the mine in production is about $120 million.

RESERVES AND GRADE The most recent reserves are as follows: 7 million tons grading .39% W, .22% Mo, .11% Bi; 19 million tons grading .02% W, .14% Mo and .08% Bi; and 2.6 million tons grading .42% Sn, .055% W, .05% Mo, .06% Bi.

DEVELOPMENTS, 1982 Underground work in preparation of production proceeded by detailed drilling and underground workings probably will be significantly expanded.

OUTLOOK Geologic evidence indicates that ore tonnage presently outlined by detailed drilling and underground workings probably will be significantly expended.

Figure 14. Mount Pleasant tungsten mine site.

EXPLORATION ACTIVITY IN NORTHERN NEW BRUNSWICK

BASE METALS

Exploration activities in northern New Brunswick are primarily aimed at finding massive Zn-Pb-Cu-Ag sulphide deposits in felsic volcanic rocks of the Miramichi Zone. In recent years, however, there has been increasing interest in (1) the pillow basalts of the Fournier Group, hosts to the Turgeon (Heron) Zn-Cu sulphide deposit; (2) W-Sn-Mo-Cu and Uranium deposits in late Paleozoic granitic rocks and their contact aureoles; (3) Uranium in Carboniferous rocks and (4) gold in a variety of geological environments. Activity in mineral exploration in 1982 reflects these interests, but on a drastically reduced scale from the past years. In fact the number of companies active in the region was the lowest in the 28 year exploration history of the so-called Bathurst-Newcastle Camp.

As in the past two or three years, most of the exploration was carried out by Noranda interests, viz., Brunswick Mining & Smelting Corporation Ltd., Noranda Exploration, and Mattagami Lake Exploration. These organizations investigated dozens of claim groups in all the geological environments mentioned earlier.

HIGHLIGHTS OF 1982

Brunswick Mining and Smelting - Noranda Exploration continued work on the Flat Landing and Nine Mile Brook Sulphide Deposit optioned from Sabina Industries in 1981. Eleven diamond

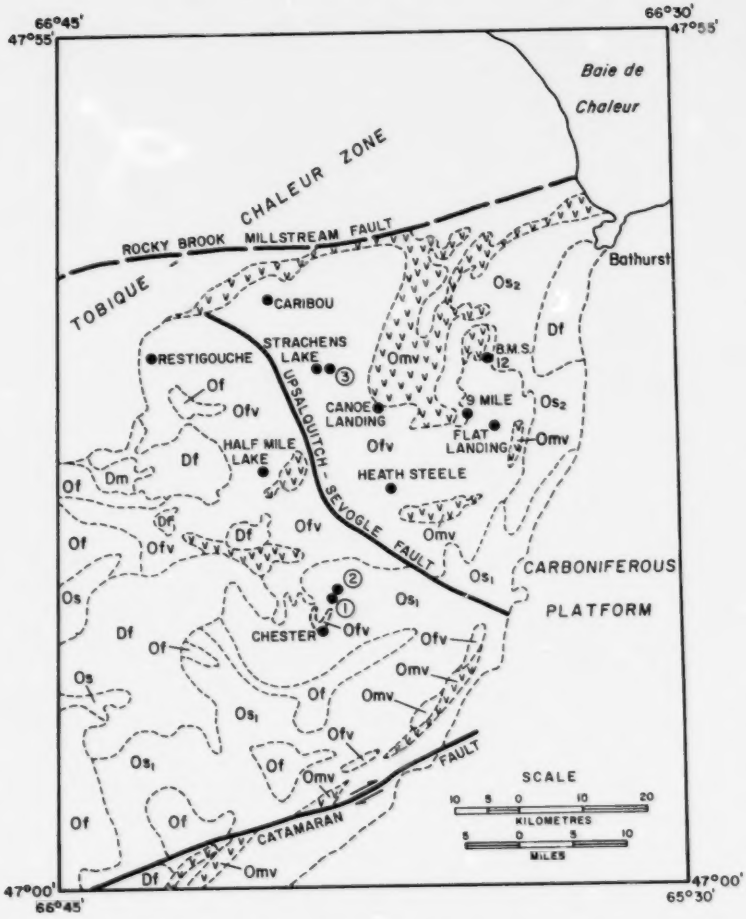

Figure 15. New sulphide deposits discovered in 1982

• ③ New sulphide deposits

Df	Devonian granite	Os2	Younger sediments
Of	Ordovician granite	Omv	Mafic volcanic rocks
Os1	Older sediments		

drill holes were put down in late 1981 and early 1982 and significant thicknesses of sulphides were intersected. Brunswick will spend a substantial amount of money in 1983, to drill the sulphide zones at depth and along strike. Brunswick Mining and Smelting - Noranda report two and possibly three new sulphide deposits in the Tetagouche Volcanic Complex. Two were found in their Clearwater claim group (Figure 15). One occurs near the Sheephouse Brook (Bellchasse) sulphide prospect found in the mid 1950's, and the other was discovered about 3.2 km (2 miles) farther northeast. The latter was found in an area characterized by stream silt base metal anomalies outlined by a 1980 N.B. Mineral Resources survey. Induced polarization and geochemical anomalies provided drilling targets in both cases. The structure of the area is dominated by gently plunging recumbent folds, and it is likely that the sulphide concentrations will be traceable by drilling over a wide area. The third sulphide discovery was intersected in drill holes just east of the Strachen's Lake Brook sulphide deposit (found by Findathoran Syndicate in the late 60's and 70's). Brunswick Mining and Smelting have not yet reported details of these finds.

Brunswick M. & S. also drilled several deep holes in the Canoe Landing Lake sulphide deposit. Sulphides were intersected, but the overall low grade of the deposit has not changed.

Nattagami Lake Exploration explored properties surrounding the Heath Steele mining lease and it is understood that drilling of geophysical and geochemical targets has produced interesting results. However, no details are available.

BP Canada Ltd. investigated two properties, one is a sulphide prospect found a number of years ago by Selco in Tetagouche volcanic rocks west of the Wedge Mine. A drill program was completed in 1982, but the results are not known. The other property, the Benjamin River W-Mo-Cu prospect, received attention and a drilling program is anticipated early in 1983. The recent interest in this property, found by Soquem in the 70's, stems from the discovery of scheelite in Soquem drill core stored at the N.B Mineral Resources core library.

Billiton Canada Limited continued their assessment of the Half Mile Lake sulphide deposit, owned by Kidd Creek Mines and Baie Copper Mines. Since 1979 Billiton have drilled over 30,000 m (?) (100,000 feet) but have not reported their findings. It is believed that the early drilling tested the sulphide body at depth, whereas the object of the later drilling was to delineate the sulphides near the surface. An exploration shaft or decline appears to be the next logical step. Drilling to date may have increased the tonnage from the published figures, (see below).

Tonnage	Cu	Pb	Zn	Ag
		Per cent		oz/ton
6,800,000	0.37	2.5	6.8	?
1,000,000	2.00			

In 1982 Billiton stakes and explored a large group of claims surrounding the Half Mile Lake Mining Licenses.

An unsubstantiated report indicates Billiton will not renew its option on the Restigouche Deposit. The program since 1980 has included approximately 9,000 m (30,000 feet) of drilling, but the overall tonnage appears to be unchanged--approximately 3 million tons, grading 4.6% Pb, 5.9% Zn and 3 oz/ton Ag.

Esso Resources Canada has not renewed their option on the Turgeon Cu-Zn (Heron Mines) prospect. Over 15,000 m (50,000 feet) of drilling has apparently not outlined sufficient tonnage to make the deposit economic.

In the industrial mineral field **Elmtree Resources Limited,** with the aid of N.B. Mineral Resources geology maps, discovered two important limestone deposits in Gloucester County in 1982. One deposit, a dolomitic limestone, occurs interbedded with sedimentary rocks of the Tetagouche Group near Armstrong Brook about 4.8 Km (3 miles) north of the Road to Resources. The other deposit, just west of Sormany, comprises high calcium rock suitable for production of agricultural lime. It appears to be a bed 100 m thick in the Silurian LaVieille Formation.

Little Long Lac Mines Limited investigated the Mount Costigan Pb-Zn prospect optioned from Amoco Canada Petroleum Limited. Unofficial reports indicate trenching, stripping and geophysical surveys were conducted.

Important mining licenses expired in late 1982, causing a mild flurry of activity. **The Captain Mining License,** a property held since the 1950's by the M.J. Boylen interests and more recently by Sabina Industries was staked by Brunswick Mining & Smelting Corp. Ltd. Tonnage figures at present according to the Mines Handbook are as follows:

Tons	Cu Per cent	Ag oz/ton	Au oz/ton
343,000	1.99	0.28	0.017

Another sulphide deposit, the Beresford Cu-skarn deposit, long held under mining license, also expired. It is believed Brunswick Mining & Smelting also obtained this prospect.

Companies reporting work in northern New Brunswick in 1982 (most conducted in 1980 and 1981) are the Little River Coal Company Limited, Minorex Ltd., Canadian Occidental Petroleum Ltd., Amax of Canada Ltd., Esso Resources Canada Ltd., Atlantic Coast Copper Corp., Brunswick Mining & Smelting Corp. Ltd., Dungannon Explorations Ltd., Mattagami Lake Exploration Ltd., Key Anacon Mines Ltd., Millstream Mines Ltd., Miramichi Lumber Co., J.D. Irving Ltd., Eldorado Nuclear Ltd., Shell Canada Resources Ltd., and Westmin Resources Ltd.

Individuals filing reports of work are N. Pitre, C. Willett, M. McCombe, M. Connell, Forrest Smith and D. Johnston.

The following is a summary of assessment reports received up to December 1, 1982. See Figure 16 for locations.

COMPANIES AND INDIVIDUALS
PROPERTIES EXPLORED 1982
(to accompany Figure 16)

1. Canadian Occidential Petroleum Ltd.
2. Brunswick Mining & Smelting Corp. Ltd.
3. Mark Connell
4. Dungannon Explorations Ltd.
5. Mattagami Lake Exploration Ltd.
6. Key Anacon Mines Ltd.
7. Esso Resources Ltd.
8. Amax of Canada Ltd.
9. Michael McCombe
10. Forrest Smith
11. Metalgesellschaft Canada Ltd.
12. Cominco Ltd.
13. Billiton Canada Ltd.
14. Millstream Mines Ltd.
15. Esso Resources Canada Ltd.
16. Sabina Industries Ltd.

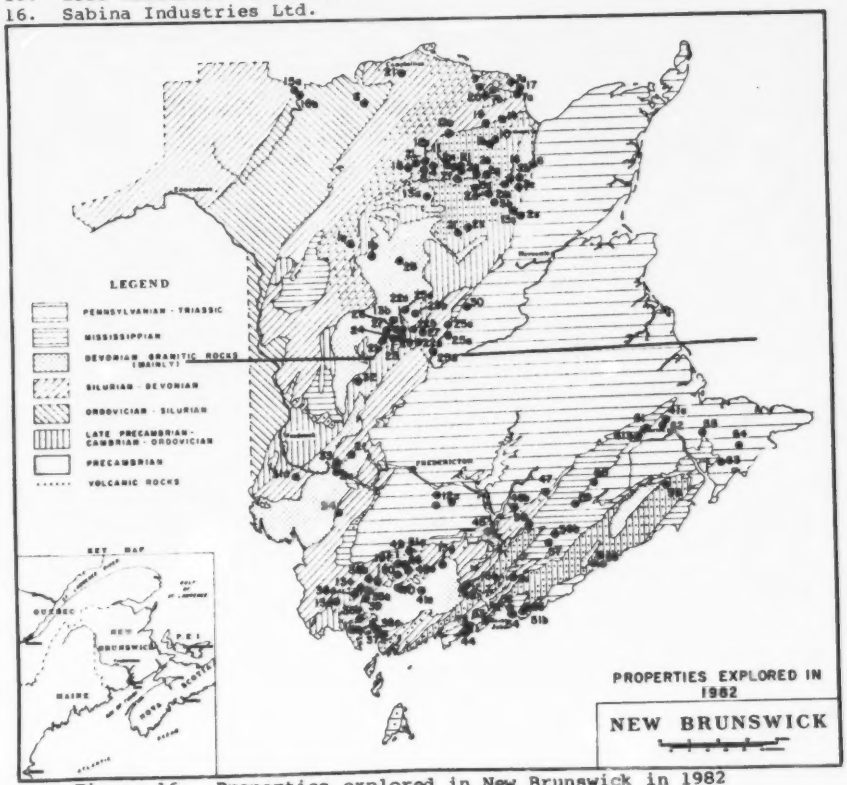

Figure 16. Properties explored in New Brunswick in 1982

17. Norman Pitre
18. Placer Development Ltd.
19. Louis Liautaud
20. C. Willett
21. Atlantic Coast Copper Corp.
22. Kidd Creek Mines Ltd.
23. Miramichi Lumber Co.
24. J.D. Irving Ltd.
25. Minorex Ltd.
26. Eldorado Nuclear Ltd.
27. Shell Canada Resources Ltd.
28. Delbert Johnson
29. Westmin Resources Ltd.
30. Little River Coal Co. Ltd.
31. B.P. Minerals Ltd.
32. K.D.A. Whaley
33. Robert Connor & Ronald Morrison
34. Dallas Davis
35. Goldfluor Explorations Ltd.
36. A.W. Lockhart
37. Peter Fernberg
38. Riocanex Inc.
39. John Stewart
40. M.E.X. Exploration Ltd.
41. Canadian Nickel Co. Ltd.
42. Uranerz Exploration & Mining Co.
43. Morton Gorden
44. J.J. Dolan
45. Dome Exploration (Canada) Ltd.
46. Maritime Resources Research Ltd.
47. J.C. Roberts
48. Wm. G. Walton
49. Malcolm Grant
50. Sullivan Mining Group Ltd.
51. H.C. McNamara
52. Peter Penety
53. Great Horn Mining Syndicate
54. Gordex Minerals Ltd.
55. Cuvier Mines Inc.
56. C.C.H. Minerals
57. Denison-Potacan
58. BP Exploration Canada Ltd.
59. Potash Company of America
60. James Colucci
61. Casan Mining Ltd.
62. Aquitaine Co. of Canada Ltd.
63. Sisco Metals of Ontario Ltd.
64. The Joint Tantramar Venture

CENTRAL PLATFORM

(26) **Minorex Limited**

(c) Whetstone Brook 21 J/9W, 21 J/16W

This property (50 claims) adjoins the north boundary of the South Renous River Group described later.

Previous exploration had outlined an extensive copper-uranium anomaly in the soil of the South Renous claims. Overburden drilling had established the anomaly which is related to the Carboniferous bedrock. Fifty claims were then staked to the northwest to cover more of the horizontal beds.

Work reported in 1982 consists of soil geochemical, radon in soil and spectrometer surveys. Radon uranium and copper anomalies outlined, are divided into two trends; (1) one follows the Carboniferous basin edge; and (2) seems to follow a low topographic ridge probably underlain by permeable conglomerate.

(e) Catamaran Fault Group 21 J/9W, 21 J/16W

Earlier work on this 177 claim group outlined radiometric and geochemical anomalies over granites north of the Catamaran Fault. The granites are K-feldspar and quartz rich rocks with minor biotite and pegmatite dykes and quartz veins are common associates.

Radon in soil gas and spectrometer anomalies were restricted to the granitic rocks. Radem anomalies outline the assumed position and trend of the Catamaran Fault. U and Mo anomalies occur in the soils on the granitic terrane, confirming earlier results. Two trenches revealed granite cut by east-west trending aplite and pegmatite dykes and quartz veinlets.

(f) Monaghan Brook 21 J/16E

This twelve claim group was staked on the basis of regional radon-in soil-gas, water-gas, and uranium soil and silt anomalies.

The area is underlain by gently dipping red, green and grey Carboniferous siltstones, sandstones, conglomerates and shale. Plant fragments and pyrite are common.

A magnetometer survey proved fruitless, whereas radon in soil gas and spectrometer results revealed an anomaly that appears to be related to a single bed. U and Cu anomalies in the soil seem to be related to cedar swamps that flank a hill occupying the central part of the property. Fifty-five overburden drill holes were put down, and samples were analyzed for U and Cu. In general U and Cu anomalies coincided with the soil results, and appear to be related to a porous sandstone bed intercalated with shale.

(25) **Little River Coal Company Limited**

Dungarvon Group 21 J/9E, 21 J/16E

This 100 claim group covers a coal prospect in nearly horizontal Carboniferous rocks.

Work reported comprises surveying and results of drilling. Drilling on the north side of the Dungarvon River was thwarted by thick glaciofluvial deposits. All previous drill holes were surveyed and new drill sites indicated.

It is estimated that using an average thickness of 0.32 m (1.05 feet) to a cut-off of 25 cm (10 inches), the coal reserves are 36,300 tonnes (40,000 tons).

EDMUNDSTON, AROOSTOOK-MATAPEDIA, AND TOBIQUE-CHALEUR ZONES

(2) **Canadian Occidental Petroleum Limited**

(a) Stew, Evy, Shin, Shingle Groups 21 O/3E

Work reported on these groups comprises line cutting, geological mapping, geochemical sampling (soils and rocks). Induced polarization, VLF-EM and magnetic surveys.

Rhyolite flows, ignimbrite tuffs and breccias dacite, andesite and basalt are the dominant rocks in the northern part of the property whereas the south is underlain by mixed intercalated felsic and mafic volcanic rock. A thick sequence of siltstone divides the two areas.

The soil geochemical survey closed off and refined several Cu, Pb and Zn anomalies outlined previously. Several anomalies are traceable to local bedrock in trenches, but others indicate an up-slope or/and up-ice sources.

The I.P. survey outlined four anomalies, most are attributable to finely disseminated pyrite and Cu-Zn-Pb sulphides. VLF-EM anomalies seem to be related to a combination of alteration and lithologic contacts.

Seventeen trenches were dug to investigate bedrock sources for geochemical and geophysical anomalies but no significant sulphide mineralization was discovered. Galena and sphalerite vug and fracture fillings were noted in one trench (No. 8), and smaller amounts were found in others (9, 14 and 15).

Rock samples with relatively high Cu-Zn-Pb were reanalyzed for gold, and one from trench no. 1 assayed 0.12 oz/ton over 1.5 m (5 feet). The rock, a rhyolite porphyry, had no visible Cu-Pb-Zn minerals or significant alteration.

(4) **Amax of Canada Limited**

Popelogan Group 21 O/15E, 21 O/10E

Work reported comprises a picket line grid 49.76 km (30.92 miles) and the results of a magnetometer, soil geochemical, induced polarization, and geological mapping.

The property is underlain by calcareous sedimentary rocks of the Matapedia (Ordovician to Silurian) and Chaleur Groups (Silurian) that are intruded by a small high level granitic pluton. The skarn developed contains molybdenite, scheelite, pyrite and chalcopyrite.

Magnetic anomalies, presumably due to pyrrhotite and/or magnetite occur with the skarn aureole. Mo, W and Cu soil anomalies were also outlined within the aureole. Less extensive Zn soil anomalies were also noted. The anomalies are in low areas and probably have their source up-slope, however, the significance of the results are not discussed.

(9) **Micheal McCombe**

McMillan Settlement 21 O/6W

Interest in this 45 claim group surrounds a barite prospect found several years ago by Coulee Lead & Zinc Mines Limited.

The barite occurs (a) in a northerly trending vein 0.6 m (2 feet) wide in Devonian rocks traceable for 300 m (1,000 feet) and (b) in a breccia 4 m (14 feet) wide associated with copper sulphides and pyrite.

In 1981, soil geochemical (Ba), gravity and magnetometer surveys were carried out. Results indicate further work is necessary.

(15) **Esso Resources Canada Limited**

(d) Patapedia M.L. 1251 21 O/14W

Work filed comprises a compilation study on this skarn occurrence. The area is underlain by limestones and calcareous siltstones of the Matapedia Group that are intruded by felsic sills and dykes. The structure is dominated by northeasterly trending steep isoclinal folds. Several Pb-Zn-Ag vein occurrences and minor concentration of chalcopyrite have been found in the region. A drill hole put down in the license cut a barren breccia that elsewhere is mineralized. Landsat images indicate the property overlies an intersection of fault zones, and should be investigated further.

(e) NQN Option

This 28 claim block is underlain by Matapedia Group argillaceous limestone that in places are intruded by swarms of felsic dykes and sills. Several Pb-Zn-Ag vein type sulphide deposits are known to the west (M.L. 1186, 1211).

1981 a VLF-EM survey was carried out using two transmitting stations (Cutler, Maine, Annapolis, Maryland). Several conductors were outlined and four are considered worthy of more detailed work.

(19) **Louis Liautaud**

Millstream Area 21 O/9E, 21 P/12W

The 1982 work comprises a stream sediment and soil geochemical surveys. The results indicated no anomalous content of Cu, Pb, Zn or Ag in the soils or silts.

(21) **Atlantic Coast Copper Corporation**

Charlo Group 21 O/16W

This eight claim group was staked in 1981 on the basis of stream silt base metal anomalies found by the N.B. Mineral Resources Division.

Work reported consists of geological, soil geochemical, magnetometer and EM-16 (VLF) surveys.

The area is underlain by east-northeast trending, northerly dipping (20 to 40°) Silurian mafic volcanic, felsic volcanic and sedimentary rocks intruded by diabase dykes and sills and a small granitic pluton that outcrops south of the claims.

Narrow east-southeast magnetic anomalies and a broad anomalous zone were outlined. The EM-16 survey revealed a strong east-west conductor, thought to be caused by a fault, and two other weaker anomalies, one coinciding with a soil base metal anomaly in the southeast corner of the group. Pb-Zn soil anomalies were also outlined in the northeast corner of the claim block.

ELMTREE SUBZONE

(1) **BRUNSWICK MINING & SMELTING CORPORATION LIMITED**

(O) Elmtree Group, Project 138 21 P/13W

The Elmtree Group comprises 18 claims located northwest of the old Keymet Mine.

Work filed consists of magnetometer Max Min II, EM, soil geochemical and induced polarization surveys, and the logs of 7 drill holes (138-81-1 to 138-81-7).

The area is underlain by northeasterly trending intensely folded argillaceous conglomerates and siltstones. The interesting Pb-Zn-Ag veins trend northwest.

The latest soil results enhance previously known anomalies but added no new ones. The magnetometer and EM surveys failed to add new data to previous surveys. The I.P. survey indicated extensive anomalous zones, attributable graphite and/or sulphide concentration.

Seven drill holes were put down to test I.P., soil geochemical, Max Min II and gravity anomalies. All intersected narrow sulphide veins associated with silicification, chloritization and bleaching. Drill hole 138-81-4 had the best intersections (see below).

Hole No.	Interval (feet)	Width feet (M)	% Pb	% Zn	% Cu	Ag oz./ton
138-81-4	212.4-216.1	3.7 (1.12)	0.026	1.04	0.02	0.20
	216.1-217.1	1.0 (0.3)	0.22	7.20	3.00	5.30
	217.1-219.1	1.9 (0.6)	0.64	13.56	10.20	18.00
	223 -223.9	0.7 (0.2)	0.24	6.90	1.42	3.00

Assays for gold proved negative.

(7) **Esso Resources Canada** 21 P/13W

(a) Claim Blocks 787, 788, 789, 790, 794, 795, 796, 797, 798, 808

Geological mapping was carried out on these properties in late 1981. The claims lie south and east of the Turgeon (Heron Mines) Cu-Zn sulphide deposit.

The rocks underlying the area comprise the mafic pillow lavas and tuffs, sedimentary rocks and gabbros of the Fournier Group, that host the Turgeon prospect. The Fournier rocks are unconformably overlain or are in fault contact with Ordovician Elmtree Group argillaceous sedimentary rock and conglomerate siltstone and limestone of the Silurian Chaleur Group.

No significant concentration of sulphides were found.

(b) Block 490 21 P/13W

Geological mapping is reported for this three-claim block. The initial interest apparently stems from an airborne EM survey, and a Pb-Zn soil anomaly found during the follow-up.

The area is underlain by Ordovician mafic volcanics, and argillaceous sedimentary rocks, overlain by Silurian argillite, greywacke and conglomerate. The supracrustal rocks have been invaded by several gabbro and diabase dykes, and a granitic pluton (Antinouri Lake granite).

No significant sulphide concentrations were found.

(c) Block 413 21 P/13W

Work filed consists of an induced polarization survey. Results indicate a weak anomaly judged to be low priority.

(17) **Norman Pitre** 21 P/13W

(b) Belledune Area

These 14 claims were staked as a result of encouraging results obtained on the nearby Turgeon (Heron Mines) Cu-Zn sulphide showing.

Magnetometer, soil geochemical, VLF-EM surveys are reported in 1982.

The area is partly underlain by conglomerate, siltstone and limestone of the Silurian Chaleur Group that seems to form a thin unconformable cover on the mafic volcanic rocks of the Ordovician Fournier Group.

The soil survey revealed one relatively strong (Zn, Pb, Cu, Ag) anomaly, coincident with a previously outlined VLF-EM cross-over.

(20 **C. Willett**

(a) (Antinouri Lake) Project 143 21 P/13W

This property was originally staked to cover a magnetite skarn occurrence in rocks of the Elmtree Group. Work reported by Brunswick Mining & Smelting covering a period from November 1980 to December 1981, comprises soil geochemical, Max Min-HEM and Induced Polarization surveys. Three diamond drill holes (143-81-1, 143-81-2, 143-81-3) were put down to test the best targets.

Most I.P. anomalies were due to dark brown to black pyritic and weakly graphitic sedimentary rocks. The skarn was outlined by I.P., Max Min and magnetic anomalies.

Drill hole 143-81-1 encountered silicified chloritized hornfels intermixed with grey banded limestone and brecciated skarn. Minor amounts of sulphides were noted. The $CaCO_3$ equivalent ranged from 84.7% to 88.8%.

Drill hole 143-81-2 meant to test the down dip extension of a surface showing of Cu-Zn-Ag sulphides, proved negative. Several layers of skarn with only weak base metal concentrations were encountered. No scheelite was noted.

Hole 143-81-3 cut dark hornfelsed argillite, greywacke conglomerate, grit and pyritiferous argillite and sandstone.

(a) A'Hearn Option, Project 145 21 O/8

This group of twelve claims (optioned from W.P. Hachey) covers a small massive sulphide deposit found by Findathoran Syndicate in 1968. Up to that time, several companies had explored the area to seek out the source of a base metal stream silt anomaly discovered by Selco in 1955.

Work reported in 1982 comprises linecutting, geological, soil geochemical, HEM, I.P., magnetometer and gravimetric surveys.

The property is underlain by poorly exposed intercalated felsic tuffs, agglomerate, rhyolite, felsic porphyries, graphitic sediments and hematitic iron formation. The sulphide deposit is small but high grade, 1.5 m (5 feet) in drill hole OH-34, assayed 2.26% Cu, 16.6% Pb, 29.1% Zn and 6.10 oz/ton Ag. It is sandwiched between felsic tuffs and graphitic and/or hematitic sediments.

Several Cu, Pb, Ag, Zn anomalies were outlined in soils. Pb content ranges from 100 to 1700 ppm, and Zn 250 to 5140 ppm.

Several weak HEM anomalies were found, but most if not all appear to reflect graphitic formations. Three I.P. anomalies also appear to be correlative with graphitic rocks. The magnetic and gravimetric results were inconclusive.

Drilling to test various anomalies, was in progress at the time of filing (late 1981).

(b) Lavigne's Brook (Project 209) 21 P/5W

This eleven claim group, adjoining the southeast corner of the Brunswick No. 6 mine lease has been investigated several times since 1953. Early interest stemmed from an airborne magnetic survey.

Work reported late in 1981 consists of line-cutting, geological, Max Min HEM, soil geochemical, magnetometer and gravimetric surveys.

Three soil geochemical anomalies were outlined. The most prominent apparently was drilled by New Jersey Zinc in the mid 1950's. The other two appear to be associated with a gabbro-felsic volcanic contact. The area is underlain by southerly trending intercalated complex of felsic tuffs, basic lavas, and tuffs gabbro, and iron formation. Iron formation gives rise to a strong narrow magnetic and Max Min anomaly. Five targets are recommended for shallow drilling.

(c) Beehler Group (Project 210) 21 P/5W

The eleven claim Beehler group adjoins the south boundary of Project 116N. Geological, Max Min-HEM, soil geochemical, magnetometer and gravity surveys were carried in 1981. Three soil anomalies were found, the best one apparently caused by iron formation was drilled by New Jersey Zinc. Others seem to be associated with gabbro-felsic volcanic contact.

Several gravity highs were outlined. Some are caused by gabbro, others by quartz-feldspar augen schist and felsic tuffs.

The property lies on east limb of "New Highbridge" isoclinal syncline. Rocks comprise intercalated argillaceous sediments, felsic tuffs, basaltic volcanics, iron formation and gabbro.

A magnetometer anomaly drilled by New Jersey Zinc, intersected iron formation and sulphides.

(d) Roger Lake Camp Group 21 O/8E

Line cutting and a magnetometer survey are reported for this 34 claim group in 1982. Gravity, Max Min II, geochemical, and geological surveys were carried out and will be filed later. The uncontoured results reveal a flat magnetic pattern, with only one small anomaly 120 m long in the centre of the property.

(e) Canoe Landing Lake Extension 21 O/8E
(Project 211)

This property, consisting of 57 claims, surrounds M.L. 1231 that covers the Canoe Landing Lake massive sulphide deposit (discovered 1960). The work reported carried out in 1981, comprises line cutting, Max Min EM, magnetometer, geochemical and gravity surveys. The area is underlain by intercalated argillaceous and graphitic sediments, felsic tuffs, overlain by mafic volcanic and sedimentary rocks. No significant geochemical anomalies were found. Weak magnetic anomalies are attributed to iron formation.

Drill hole 211-1 put down to test a gravity anomaly, cut felsic tuffs and graphitic, argillaceous sediments. Three thin layers of pyrite were encountered from 227 to 229 m (748 to 753 feet).

A second report covers the drilling program carried out in 1981, plus magnetometer, geochemical, gravity and geological surveys.

Drill hole logs are reported for holes 212-1, 212-2, 212-3, 212-4, 212-5, 212-6, 212-7, 212-8, 212-9, 212-10, 212-11, 212-12, 212-13, (6,510 m or 21,360 feet). The drill holes except 212-9, 212-11 were put down to test depth extensions of the sulphide layer.

The best intersections are tabulated below:

Hole No.	Width M (Ft)	Depth M	Pb %	Zn %	Cu %	Ag oz/ton	Au
212-3	3.5 (11.5)	474 -477.5	0.88	2.47	0.48	1.3	0.02
212-4	2.1 (7.0)	402 -404	0.71	2.11	0.50	1.26	0.028
212-6	5.3 (17.5)	550 -555.3	0.67	1.81	0.67	1.04	0.05
	2.2 (7.5)	555.3-557.8	0.67	2.62	0.20	0.92	0.03
212-10	4.1 (13.5)	567.8-571.8	0.94	2.50	0.38	1.17	0.03
212-12	11.4 (37)	808 -819.4	0.52	1.70	0.71	0.93	0.03
212-13	3.1 (10.2)	997 -1000	0.52	1.44	0.32	0.84	

Holes 212-9 and 212-11 tested an EM conductor outside the main sulphide zone. No significant sulphides were found.

(f) Three Corner Lake, Project 151 21 O/8E & W

This property, comprising 108 claims, was staked to cover an airborne magnetic anomaly and coincident Cu-Zn anomalies in soils found in 1957.

Work carried out in 1982 comprised silt sampling, and a geological survey. The area is underlain by a diverse assemblage of felsic tuffs, and mafic lavas, tuffs and breccias, with intercalated graphitic argillites, greywacke and magnetite iron formation.

The silt survey indicated a geochemical anomaly in the general area of soil anomalies found by earlier surveys.

(g) Swamp Lake Property, 21 O/8E
Project 206

Reports filed in 1982 cover field work carried out in 1980 and 1981 on 125 claims. Interest in this area stems from a sulphide showing discovered by Rio Canadian in 1962, (see Open File Report 81-25, p. 71).

The work reported in 1982 comprises extension of the picket line grids to the west of the showing and additional magnetometer, Max Min HEM, geochemical, and gravity surveying.

The magnetometer survey outlined what appears to be a westerly plunging fold. Several EM conductors were detected, one reflects the known sulphide occurrence and another, with a coincident gravity anomaly, may have been tested by Cominco, 1959. The geochemical survey outlined the glacial smearing of the sulphide showing, and turned up an untested anomaly. Although the sulphide showing is associated with a gravity anomaly, most are related to gabbro or basalt.

The property is underlain by basaltic and rhyolitic volcanics, intercalated with mainly argillaceous sedimentary rocks. The dominant structure is a westerly plunging antiform (see N.B. Mineral Resources Map 76-60).

Five drill holes (206-1, 206-2, 206-3, 206-4, 206-5) were put down to test targets outlined by the geophysical methods. Hole 206-1 cut mafic volcanics and intercalated sediments with minor pyrite. Hole 206-2 encountered felsic volcanics, graphitic sediments and mafic volcanics. The latter apparently gave rise to the gravity target. Holes 206-3, 206-4, 206-5 were drilled in EM and gravity anomalies extending westward from the Rio Canadian sulphide showing. Low grade disseminated and stringer-type pyrite-chalcopyrite was encountered in felsic volcanic rocks. Previously reported gold content however, could not be duplicated.

(h) Middle River Property, 21 O/9E
Project 213

These claims adjoining the east of Forrest Smith's M.L. 1249 (see page 25) was originally staked to cover airborne EM conductors. Work reported consists of line cutting, geological, magnetometer gravity and Max Min EM surveys.

The geology comprises southerly trending intercalated basaltic flows and tuffs and argillaceous sediments, underlain by altered felsic tuffs, and intruded by gabbro sills and plugs.

Most magnetic anomalies are attributable to weakly to strongly magnetic basalt, one may be related to the chlorite schist that hosts the Smith copper showing.

Gravity anomalies outlined in several places appear to reflect mafic flows and intrusions. The Max Min II results indicated several conductors most of which seem to be due to graphitic sedimentary rock. A weak conductor with a coincident weak magnetic and soil copper anomalies seem worthy of further work.

(i) Clearwater Group 21 O/1E
Project No. 140

Work reported in 1982 consists of geological and geochemical surveys on the southern part of this large group of 1,179 claims. The area is underlain by polydeformed rocks of the Tetagouche Group. It appears the early folds (F_1) are recumbent (1/2 wavelength 800 m) due to thrusting from the southeast F1 structures have been refolded into accordion folds with northwesterly trending axial surfaces. F_3 kink folds are superimposed on the earlier structures. It is postulated that thrust faults are present in the area but none have been definitely recognized. The Sheephouse Brook Valley is thought to reflect one such thrust.

The stratigraphic succession seems to be (bottom to top)

(1) "ignimbrite", felsic tuffs, basalt and associated sediments,
(2) intercalated mafic volcanic rocks and quartzose greywacke with thin iron formation layers, chert and felsic tuffs,
(3) "ignimbrite"
(4) sericitic and chloritic tuff, minor agglomerate
(5) greywacke and phyllite.

The Sheephouse Brook (Bellechasse) sulphide showing appears to be hosted by unit (1), whereas the Chester sulphide deposit south of the property is associated with units (3) and (4).

The geochemical survey outlined several soil anomalies in Cu, Ag, Pb and Zn. A large area surrounding the Sheephouse Brook showing is anomalous in Pb and Zn.

Two drill holes by Bellechasse intersected sulphides with the best section in no. 9 hole assaying 0.4% Cu, 2.2% Pb, 5.3% Zn and 0.8 oz/ton Ag over 4.6 m (15 feet). Many other anomalies occur in areas considered to have favourable geology.

(j) A'Hearn Extension 21 O/8
Project 150

This property, consisting of 215 claims, was covered in 1981 by Max Min-HEM, magnetometer, gravimeter, and soil geochemical surveys. Original interest was aroused in 1980 by geochemical and geophysical anomalies. The claims surround the A'Hearn Brook sulphide deposit (see B.M.&S. Project 145, page 12).

The area is underlain by Ordovician felsic and mafic volcanic rocks and argillaceous sedimentary rocks intruded by gabbro. The rocks form the south to southwesterly-trending limb of the Tetagouche anticlinorium. Numerous soil anomalies ranging from 120 to 975 m long (393 to 3,198 feet) and 60 to 180 m wide (196 to 590 feet) were outlined parallel to the bedrock trend. The zones are coincident with weak conductors, one of which reflects the A'Hearn Brook deposit.

The Max Min II-HEM outlined several poorly conductive north-south trending zones. Earlier drilling has proved some are due to graphite.

Several magnetometer anomalies were also observed, the strongest, probably related to iron formation, is flanked by weak EM conductors.

A trough due to interbedded sedimentary formations hosting the sulphide zone is the only gravity feature noted.

(k) Miramichi Group, Project 142 21 O/1E

This property comprising 173 claims, adjoins the Clearwater Group (see page 17). The work reported in 1982 consists of soil geochemical, magnetometer and Max Min II EM surveys.

The area is underlain by Tetagouche Group greywackes and slates overlain by an intercalated sequence of felsic porphyritic tuffs and interlayered dark grey slate and greywacke.

Extensive soil metal anomalies were outlined particularly in silver (up to 41 ppm). Also noted are lead anomalies up to 620 ppm, zinc anomalies up to 600 ppm and copper up to 370 ppm.

The strong magnetic anomalies, due to iron formation and disseminated magnetite in felsic volcanics, correlate well with geochemical soil and Max Min II anomalies. Several drill targets have been outlined and will be tested later in 1982.

(l) Upsalquitch Lake, Project 170 21 O/8E & W

This area has received a lot of attention from exploration companies since 1955. The interesting features include favourable geology, airborne EM and soil geochemical anomalies. The latest episode stems from a geochemical silt anomaly outlined by the N.B. Mineral Resources survey.

The area (48 claims) is underlain by a highly deformed southwesterly trending synform involving argillaceous and graphitic sedimentary rocks and felsic volcanics of the Tetagouche Group.

Work reported comprises line cutting and a magnetometer survey. The magnetic survey outlined a broad southwesterly trending zone approximately 480 m (1,600 feet) wide with numerous narrow anomalies up to 5,000 gammas above background. Pyrrhotite in sedimentary rocks is thought to be the source. A break in the magnetic trends correlates well with a topographic lineament and suggests that Upsalquitch Lake and the Upsalquitch River are fault controlled.

(m) Nepisiquit Brook, Project 166 21 P/5W

The Nepisiquit Brook Group, comprising 65 claims is tied to the south boundary of M.L. 1273 (Flat Landing Brook sulphide deposit, p. 29).

Work reported in 1982 comprises line cutting, Apex Max Min II EM, magnetometer, soil geochemical and geological surveys.

The eastern part of the property is underlain by poly-deformed intercalated felsic tuffs, porphyritic felsic tuffs (quartz and feldspar), iron formation of the Tetagouche Group. Intrusive rocks comprise diabase, gabbro and quartz feldspar prophyry. The geology is a continuation of that in the vicinity of the Flat Landing area to the north. The EM survey outlined several weak EM conductors, one of which was tested by two drill holes many years ago (1954).

Magnetic anomalies seem to reflect responses from diabase dykes, gabbro ("diorite") intrusion and iron formation.

Soil geochemical results indicated scattered weak one sample anomalies.

(n) Indian Lake, Project 124 21 O/8E & W

Work reported in 1982 consists of the results of geological mapping and a soil geochemical survey completed in 1981.

The property is underlain by southerly trending intercalated rhyolitic tuffs and schistose, quartz-feldspar porphyry. Rhyolite float carrying sulphides and magnetite have been found but their source has not been located.

The soil results turned up scattered weak Pb and Cu anomalies. Despite the discouraging results, two drill holes are planned for 1982.

(p) Slate Island Group

Access to this area is severely limited by landowners J.D. Irving Co. Ltd., and Miramichi Lumber Company who charge for use of their roads and do not allow overnight camping.

Work reported in 1982 comprises a soil geochemical survey, prospecting, VLF-EM and collection of samples for preparation of heavy mineral concentrates.

Four heavy mineral samples (12 to 22 kg) collected along 1,220 m of McLean's Brook were sieved and panned down to 0.22 kg (0.5 lb) and analyzed for Mo, Sn and W.

The results are as follows:

Sample Location	Mo	W	Sn
CYH1, 32E, 56N	31	700	320
CYH2, 29E, 40N	29	540	280
CYH3, 39E, 24N	25	690	160
CYH4, 32E, 16N	25	760	190

Additional sampling was carried out on several W, Mo and Sn anomalies outlined previously east of McLean Brook. A two line VLF-EM survey indicated a coincident conductor. Prospecting suggests a deeply weathered Burnthill granite underlies the anomalous area.

(q) Gilman Brook 21 J/10E

This group of 51 claims lies within an area where no over-nighting is allowed (Miramichi Lumber Company rights).

The area is underlain by Cambro-Ordovician sedimentary rocks intruded by a late Devonian granite (Burnthill granite).

Work reported comprises a magnetometer survey (66.6 km or 41.4 miles). The results indicated an iron formation along the north boundary and anomalies in the northeast corner may indicate granite. The over all magnetic picture will aid in the geological interpretation.

(r) Burnthill Brook and McLean Brook 21 J/10W

The property consists of 131 claims largely underlain by the Burnthill granite. Work reported consists of soil sampling, VLF and magnetometer surveys. Silt samples and five heavy mineral concentrates were also obtained from the streams.

Strong Mo soil anomalies (up to 285 ppm) and coincident northwesterly-trending VLF-EM can be followed for 2,400 m (8,000 feet). The heavy mineral concentrates also indicate a tungsten association. U and base metal contents were generally normal, though U-Pb anomalies occurred near the margin of the granite and in a possible fracture system thought to control Mo mineralization.

(s) Smoker Brook Group 21 P/4W, 21 P/5W

Most of this 105 claim group is underlain by a wedge of flat-lying Carboniferous sedimentary rocks that unconformably overlies polydeformed sedimentary rocks of the Ordovician Tetagouche Group.

Work completed in early 1982 comprised a Max Min II horizontal loop EM survey.

The results indicate three anomalous areas; however, the conductors are not related to gravity or magnetic anomalies.

(2) **Canadian Occidental Petroleum Limited**

(b) Long Lake Group

The 1981-82 winter program, consisting of alphameter, bathymetric and lake sediment geochemical surveys, was aimed at guiding a winter drilling program on the ice of Long Lake.

The alphameter survey indicated that anomalous radon occurs near mouths of streams entering Long Lake. From previous surveys, these streams were known to have anomalous uranium in silts and water.

Twelve anomalous zones have been outlined for several elements. Seventeen individual anomalies occur within these zones. Four of these are considered first class, nine second

class, and four third class anomalies. They appear to be related to W-NW, E-W, and NE-SW lineaments that in turn reflect a hydrothermal vein system hosted by muscovite granite, quartz monzonite, rhyolite porphyry and hornfels.

(b) Shawn and Long Groups 21 O/2W

A second report describes magnetic, VLF-EM and induced polarization surveys, carried out on ice covering Long Lake in the winter of 1981-82. The magnetic survey proved fruitless whereas the VLF-EM yielded some structural data. The IP outlined six anomalies which are recommended for drilling.

Tests were also conducted with a horizontal loop electromagnetic unit over sulphide mineralization encountered in drill holes 80-1, 80-2, 80-5. The results indicated the sulphide concentrations were poor conductors. Anomalies are not considered diagnostic enough for this method to be used for further exploration. Plans for a HEM survey over Long Lake were abandoned.

(3) **Mark Connell**

Upsalquitch Property 21 O/8W

This group was staked in 1979 to cover airborne magnetic anomalies located in a much earlier survey. Work reported comprises magnetic, spontaneous polarization, VLF-EM soil geochemical and geological surveys.

The claims are underlain by poorly exposed felsic sericitic and chloritic tuffs. The magnetic survey located two small intense anomalies, and the SP survey indicated coincident electrical anomalies. The soils in the area were only weakly anomalous in Pb. Trenching failed to reveal the cause of the anomalies, hence two short drill holes are recommended.

(4) **Dungannon Explorations Limited**

M.L. 1297 21 O/8W

This property is under option to the South Bathurst Joint Venture (Metallgesellschaft Canada, Aquitaine Co. of Canada Ltd., and U.S. Borax and Chemical Corp.).

The license covers a small showing of sulphides (Upsalquitch TV Tower occurrence) found as a result of ground follow up of AEM anomaly. Three drill holes encountered sulphide concentrations.

Work submitted in 1982 consists of VLF-EM, Mise a la Masse, and induced polarization surveys. Three drill holes were put down to test the resulting anomalies.

The VLF-EM survey indicated two sub-parallel conductors which are in part due to sulphides. The Mise a la Masse survey using drill holes 78-1 and 78-5, indicated poor correlation between the two sulphide intersections. The IP results traced the mineralized zone south and confirms the VLF-EM data.

Drill holes 81-1 and 81-4 were collared in the same section 100 m apart. 81-1 dipped 45° east. The holes cut a variety of porphyritic and fine grained felsic tuffs, schists and metabasaltic rocks. Pyrite-pyrrhotite concentration up to 10 to 20% were encountered over widths of several meters. Drill hole 83-1, meant to test down dip extension of Pb-Zn-Ag sulphides found in 1979 holes 78-1 and 78-2, encountered only minor sulphide concentrations.

(5) **Nattagami Lake Exploration Limited**

(a) East Boundary (Heath Steele) Extension — 21 O/8E

Soil geochemical and magnetometer surveys were reported for this property of 21 claims early in 1982. The area covers the extension of the Heath Steele "favourable horizon". It is underlain by rhyolite tuff, quartz feldspar porphyry and basaltic tuff.

The soil analyses (53) revealed anomalous Pb and Zn up to 6 times background. The magnetometer survey consisted of 1.64 km (1.02 miles) along one line. A small magnetic anomaly, coincident with a weak Pb-Zn soil anomaly, was detected. No explanation is offered for these features.

(b) Miramichi Project — 21 O/1E, 21 O/9E, 21 P/4W, 21 P/5W

Geological, geochemical, induced polarization, and magnetometer surveys are reported as work completed in 1981.

The area is underlain by felsic tuffs, porphyries, and various mafic tuffs and flows. It is believed the mafic volcanics are the youngest rocks and may be covering the "favourable horizon" (for massive sulphide deposits) in this area.

The soil survey outlined several Pb and Zn anomalies in the northern part of the property, however, the geophysical data is not reported.

(6) **Key Anacon Mines Limited**

M.L. 1287 — 21 P/5E

Work reported comprises seven drill holes (1,131 m or 3,712 feet) put down from July to October, 1981.

Holes KE-3 and KE-4 tested a strong EM-16 anomaly 760 m (2,500 feet) long, east of the main sulphide zone. The anomaly source was graphitic and pyritic chert. KE-4, KE-5, KE-6, KE-7 and KE-8 tested EM-16 conductors under the Nepisiquit River, west of the main sulphide zone. The anomalies reflected pyritic felsic tuffs overlying graphitic phyllites.

KE-9 tested the down dip extension of the No. 1 sulphide zone. The weakly developed sulphide zone was encountered from approximately 277 m to 284 m (908 to 932 feet).

(10) **Forrest Smith**

M.L. 1249 21 O/9E

This property was optioned by Brunswick Mining & Smelting Corp. in 1981. The property comprises M.L. 1249 and ten other claims.

The interest centers around a chalcopyrite showing in chlorite schist discovered by Arnold and Forrest Smith in 1968. The work reported consists of geological, magnetometer, gravity and Max Min II HEM surveys.

The area is underlain by north-south trending intercalated basalt flows and tuffs, gabbro, chlorite schist and agglomerate. The sulphide showing comprising bornite, pyrite, malachite and minor magnetite is hosted in a dark crenulated green banded chlorite-epidote schist and agglomerate.

The gravimeter and magnetometer surveys traced the basaltic rocks but did not accentuate the Smith Showing.

Most of the Max Min II anomalies are attributed to graphitic sedimentary rock, however, a discrete anomaly is associated with the sulphide zone.

(11) **Metallgesellschaft Canada Limited**

Long Pond 21 O/8W

Work reported in 1982 on this 84 claim group was carried out by the South Bathurst Joint Venture. It consists of Max Min II EM, gravity, self potential and induced polarization surveys and trenching.

The IP survey outlined strong anomalies that are attributable to graphitic rocks. Felsic volcanics with disseminated sulphides caused a weak response.

The Max Min II results also showed the graphitic formations known from previous drilling.

Weak gravity anomalies flanking EM conductors are unexplained.

(12) **Cominco Limited**

(a) Tet Property 21 O/9W

This 35 claim group was staked as a result of a stream silt survey carried out by the N.B. Mineral Resources Division in 1980.

The property, which is tied to the northeast corner of M.L. 798A (Anaconda Caribou sulphide deposit), is underlain by intercalated mafic volcanic and argillaceous sedimentary rocks with minor felsic tuffs.

Work reported consists of a soil geochemical survey. The results indicated scattered weak one sample anomalies in Pb and Zn, but their significance is not discussed.

(b) Upsalquitch Property 21 O/8W

This property consisting of 23 claims was staked in 1981 as a result of a N.B. Mineral Resources stream silt survey.

This group is underlain by Tetagouche Group felsic volcanic, and argillaceous sedimentary rocks that form part of an easterly trending deformed synform.

Initial work reported consists of a soil geochemical survey (107 samples) over the northwestern part of the group. No significant Pb, Zn, or Cu anomalies were discovered.

(13) **Billiton Canada Limited**

(a) Half Mile Lake 21 O/8W

This property consists of M.L. 998 and 1010 under option from Kidd Creek Mines, and 181 surrounding claims staked by Billiton. M.L. 1281, mainly owned by Mattagami Lake Mines also lies within the block.

M.L. 998 and 1010 cover a large massive Zn-Pb-Cu sulphide deposit originally found by Texasgulf and Conwest in the 1950's. Billiton optioned the properties in 1979, and have since carried out approximately 30,000 m (98,425 feet) of diamond drilling. However, none of this work has been reported to the N.B. Mineral Resources Division.

The work reported in 1982 consists of a picket line cutting and a road access map on the claims surrounding the mining licenses.

The report indicates that soil geochemical, magnetometer, VLF-EM and geological surveys were to be carried out in 1982.

(b) Long Lake Property 21 J/10E & W

This property consists of 357 claims. Work reported comprises geological, geochemical, airborne magnetometer, scintillometer, and VLF-EM surveys.

The eastern part of the area is underlain by polydeformed "Cambro-Ordovician" sedimentary rocks that are intruded by two phases of Ordovician granite and a Devonian (Dungarvon) granite. The western part if underlain by Ordovician augen gneiss intruded by Ordovician granite, and two phases of Devonian granite (Lost Lake, and Burnthill granites).

Heavy mineral concentrates from soils yielded a few one sample anomalies in W, Sn or Mo. The airborne magnetometer survey was useful in that it distinguished between the Cambro-Ordovician and Ordovician rocks and also characterized the Burnthill Granite. VLF-EM anomalies are scattered throughout the claim

group but their source has not been determined. Tridem EM indicated few conductors in the area.

The Burnthill Granite gives rise to a radiometric anomaly, however, the rest of the area is radiometrically flat.

(c) Sprig Brook 21 P/4W, 21 P/5W

Work reported on these claims comprises stream sediment sampling and an evaluation of airborne EM work carried out by Heath Steele Mines (1973) and the South Bathurst Joint Venture (1977). The property comprises 12 claims optioned from K.D.A. Whaley, and 116 claims staked by Billiton.

The claims are underlain by northeasterly trending intercalated Tetagouche Group mafic lavas, felsic tuffs, quartz feldspar metaporphyries and argillaceous sedimentary rocks. The stream sediment survey indicated consistently high Zn in the Tomogonops River system near the northwest boundary. An additional seven claims were staked in this area. Three to five channel AEM anomalies are also outlined in the area.

(14) **Millstream Mines Limited**

M.L. 1212 21 P/12W

M.L. 1212 covers several vein-type deposits of Zn-Pb-Ag-Sb sulphides discovered over an exploration period of 100 years.

Work reported in 1982 comprises drill hole 82-1, put down to test coincident Pb soil, magnetic and VLF-EM anomalies. The hole cut Silurian conglomerate-greywacke, serpentinite and fault gouge.

Although the results are not discussed, the magnetic anomaly was apparently due to the conglomerate-serpentinite, and the fault zone was likely the cause of the VLF-EM response. The Pb soil anomaly however, is unexplained.

(16) **Sabina Industries**

M.L. 1273 (Opt. B.M.&S.) 21 P/5W
Project 161

Mining License 1273 covers two massive sulphide deposits, the Nine Mile Brook deposit found by Cecil Smyth in 1963, and the Flat Landing Brook deposit found by Sabina Industries in 1975. Brunswick Mining and Smelting Corp. optioned the property in 1981. Work reported in 1982 comprises line cutting, Max Min HEM, induced polarization, gravity, magnetometer, soil geochemical and geological surveys.

The Max Min survey outlined previously known conductors and it is noteworthy that the Flat Landing Brook deposit is a poor conductor. In the area of the Nine Mile Brook deposit, several conductors were outlined but most are probably due to graphite. Interpretation of gravity anomalies is complicated by

combined effects of closely associated massive sulphides, gabbro intrusion and iron formation.

Several gravity anomalies were interpreted due to gabbro ("Diorite") because of the weak magnetic response over these anomalies. The magnetic survey also clarified the distribution of oxide facies iron formation to the west of the Flat Landing Brook deposit.

The Flat Landing Brook Zn-Pb-Ag sulphide deposit comprises four sulphide layers (A, B, C and D) within a zone of chloritic felsic tuffaceous rocks, approximately 233 metres thick. However, the most promising at present (A and B), grade laterally and vertically into disseminated sulphides and magnetite-chlorite-chert-sulphide iron formation. The massive sulphide-bearing zone is sandwiched between an older sequence of fine-grained altered (dominantly talc-sericite) felsic tuffs and quartz augen tuffs and younger altered (talc-sericite and chlorite) felsic tuffs and agglomerates. The sulphide deposits and host rocks have been intruded by an irregular mass of metagabbro ("diorite"). The intrusion, which has dykes and sill aspects, cuts off the sulphide layers in some places and makes correlation from section to section difficult.

Eleven diamond drill holes were put down by Brunswick Mining & Smelting in 1981-82. The best results are summarized below.

Hole No.	Width (metres)	Pb %	Zn %	Cu %	Ag oz/ton	Au oz/ton
161.3-81						
A Horizon	3.57	0.74	8.9	0.05	0.58	
B Horizon	4.99	0.08	0.66	0.02	0.18	0.001
165-5-81						
A Horizon	2.7	0.33	2.44	0.007	Tr.	
B Horizon	1.3	0.22	0.54	0.004		
C Horizon	1.86	0.15	1.48	0.004		
161-6-81						
B Horizon (I)	0.8	1.0	0.74	0.15	2.25	0.003
(II)	1.09	2.28	3.13	0.03	2.55	0.001
C Horizon	1.55	0.84	1.21	0.17	0.56	0.002
161-7-81						
A Horizon	1.3	0.84	0.66	0.026	Tr.	
B Horizon (I)	0.73	2.80	6.20	0.15	8.6	0.01
(II)	3.75	8.9	10.6	0.2	7.3	0.008
C Horizon	25.18	0.21	0.64	Tr.	0.2	
D Horizon (I)	0.15	1.4	3.0	0.1	0.89	
(II)	4.23	0.2	0.3	0.006	0.23	

(17) Borman Pitre

Roche Group 21 P/4W

Assessment work filed consists of a VLF-EM survey. Several conductors were detected but most seem to have a graph-

itic source. Base metal sulphides however, are known to occur near the contact of the graphitic sediments and felsic tuffs.

(18) **Placer Development Limited**

M.L. 1285, 1286, 1302 and 1304 21 O/7E

Logs of five diamond drill holes were submitted in 1982. Four holes (PD-60 to 63) were drilled on M.L. 1285. PD-65 on M.L. 1302, and PD-64 on M.L. 1304.

M.L. 1285 covers a showing of disseminated Zn, Pb and Ag in chloritic felsic tuffs discovered by drilling in 1976. The best section assayed 2.03% Zn over 47 m (154 feet).

The current drilling campaign tested hitherto unexplained horizontal loop EM anomalies. The holes cut mafic tuffs, gabbro, chert and felsic lapilli tuffs, but no significant concentrations of sulphides were found.

(20) **C.A. Willett**

(b) Nine Mile Brook 21 O/8E

These four claims cover the site of a discovery of Pb-Zn sulphides in 1975. Intensive exploration failed to find significant additional concentrations.

Work reported for 1982 comprises a Max Min II EM survey. Conductors were outlined but correlation with Pb-Zn sulphide showing is poor.

MIRAMICHI ZONE

(22) **Kidd Creek Mines Limited**

(a) Falls Brook Claims 21 J/10E

This group, consisting of 45 claims, was staked in 1981. Work conducted over the property in 1981-82, comprised soil geochemical, magnetic, VLF-EM, and scintillometer surveys. However, only the line cutting has been filed. The geology consists of northeasterly trending metasedimentary units of the Tetagouche Group intruded by Devonian Granite. Mo, Zn, Cu, F mineral occurrences are known in the region.

(b) Rocky Brook North 21 J/10E

Work reported in 1982 consists of Max Min II, soil geochemical and geological mapping.

The thirty-six claims (18 claims now M.L. 1335) are underlain by mafic volcanic and sedimentary rocks intruded by the Dungarvon (Devonian) granite. The structure is dominated by an anticline with a steep northeasterly dipping axial plane.

The previous work outlined a coincident strong VLF-EM conductor and magnetic anomaly. Max Min II revealed a weak zone of conductivity due to disseminated pyrite. Cu, Pb, Zn content of soils were generally normal.

(c) Dungarvon Group 21 J/10E

This group, underlain by a late phase Devonian granite, comprises fifty claims.

Work reported consists of line cutting (52.5 km). Results of soil sampling, magnetometer, VLF-EM and scintillometer surveys are to be filed later in 1982.

(23) **Miramichi Lumber Company Limited**

McLean Brook Group 21 J/10W

This 129 claim block staked in 1978-79 was converted to mining license 1316 in 1982. The boundary survey is claimed as assessment work. The original interest stemmed from Mo-W content of stream silt samples in the southwestern part of the Burnthill granitic stock. Since then drill holes have revealed MoS_2 and W bearing veinlets.

(26) **Minorex Limited**

(a) South Renous River 21 J/15E

Work reported on this eight claim group consists of stream silt, radon in soil, soil geochemical and spectrometer surveys.

The property appears to be underlain by Cambro-Ordovician quartzites and phyllites intruded by the Dungarvon granite. No outcrop occurs on these claims.

Soil samples were anlayzed for Cu, Pb, Zn, Sn, W and Mo but the results were unavailable to Minorex at filing time. U anomalies are present in the soils, but the results of the radon-in-soil and spectrometer surveys are not discussed.

(d) Dungarvon Group 21 J/9W

This eighteen claim group was staked over an outlier of Carboniferous rocks within the Miramichi Zone. The bedrock is flat-lying red conglomerate and sandstone probably occupying a graben in Silurian sediments.

The work reported, (completed in 1980), consists of radon-in-soil gas, spectrometer, radem and geochemical soil surveys.

Radem and magnetometer results were negative. Copper and Uranium anomalies were outlined along the Carboniferous-Silurian contact.

(27) **Eldorado Nuclear Limited**

Trout Lake 21 J/10E

This group, comprising 264 claims is underlain by Devonian porphyritic biotite-muscovite adamellite, which intrudes deformed Ordovician metamorphic rocks. Initial interest in this area was aroused by uranium silt anomalies outlined by a N.B. Mineral Resources regional survey. Early work outlined several radiometric and uranium in soil anomalies. Trenching revealed a complex joint system, and one area of uraniferous till. No uranium mineralization was found, but it is thought the uranium enriched granite provided uranium via the joint system after heavy rains. A large zone of interesting tungsten and tin content in soil has been outlined by the later work.

The work filed describes the results of the geological, radiometric, geochemical soil and silt surveys and trenching.

(28) **Shell Canada Resources Limited**

Sister Brook 21 J/10E

The area is underlain by polydeformed sedimentary and volcanic rocks of the Tetagouche Group, that are intruded by a variety of granitic rocks. Greisenized adamellite was noted in Fullerton Brook.

The original block of 80 claims (38 claims now included in M.L. 1338) was staked on the basis of tin in silt anomalies. Follow up till sampling outlined broad tin anomalies and in places strong tin anomalies (>500 ppm).

Trenching revealed a 25 m (82 feet) wide zone comprising arsenopyrite-quartz-chlorite (minor geisen) veins associated with a northeasterly and southeasterly trending joint system. Wolframite and molybdenite were noted in places. Cassiterite-quartz veins have been found as float in talus, but none was seen in place.

(29) **Delbert Johnston**

Little North Pole Brook 21 J/15E

This fourteen claim group is underlain by Devonian granite cut by aplitic and diabase dykes.

Work reported consists of prospecting, till and silt sampling and a small VLF-EM survey. A few heavy mineral concentrates obtained from tills contained 120 and 160 ppm W, and 70 and 40 ppm Sn.

(30) **Westmin Resources Limited**

Otter Brook 21 J/10W

This large group (now expired) was located on the north of the Miramichi Lumber Company mining license 1300, that covers the Burnthill tungsten deposit. The area is underlain by the Devonian Burnthill granite.

Work reported consists of the results of VLF-EM and geochemical surveys of soils and springs. Four drill holes were put down at two sites to test weak conductors near springs with anomalous uranium and radon. The drill holes intersected intense clay alteration zones in biotite monzonite. No significant uranium, tin or tungsten was noted.

EXPLORATION ACTIVITY IN SOUTHERN NEW BRUNSWICK

GENERAL

Mineral exploration generally slowed down because of the economic decline, but several companies and individual prospectors remained active in southern New Brunswick during 1981. There were several significant new mineral discoveries and numerous claims were staked in the gold-bearing zone along the Bay of Fundy starting late in 1982 and continuing into 1983.

Potash Company of America continued with preparations of bringing their Penobsquis salt-potash deposit into production. The Denison-Potacan exploration shaft in the Salt Springs potash-salt deposit was completed and an economic ore deposit was delineated by cross cuts, drifts and underground drilling. The company subsequently decided to proceed with preparing the mine for production. BP Exploration Canada Ltd. continued with a successful diamond drilling program that delineated the limits of their deposit.

Billiton Canada Ltd. completed mill construction and underground work at the Mount Pleasant tungsten-molybdenum-tin deposit in preparation of production, which is scheduled to start in 1983. This company also continued to be active in regional exploration for these minerals.

MIRAMICHI ZONE SOUTH

(31a) **B.P. Minerals Limited**

Eel River 21 G/13E

The Eel River Group is situated about 80 km west of Fredericton. The area is underlain by Cambrian-Ordovician, intensely folded, metasedimentary and metavolcanic rocks of the Tetagouche Group that host massive sulphide deposits in the Bathurst area. Geological mapping by B.P. Minerals Ltd. identified a

geological contact of mafic and felsic tuffs in the vicinity of an airborne EM conductor. A magnetic high suggested the presence of iron formation near this geological contact. The 1982 field program was designated to evaluate the EM anomaly. Max Min II, EM, and magnetometer surveys were completed, 374 soil samples were collected and the geology was mapped at a scale of 1:2,500. Trenching will be done to check the Max-Min and magnetic anomalies.

(32) **K.D.A. Whaley**

Napadogan 21 J/3

K.D.A. Whaley holds a group of claims in the Napadogan area, about 60 km northeast of Fredericton. The claims were staked because a highly anomalous amount of tungsten was found in a stream sediment heavy mineral study conducted by the Geological Surveys Branch (Sussex Regional Office) in the area. The area is near the contact of Devonian granite and intensely folded Ordovician pelitic and quartzitic sedimentary rocks. In the Frenchmans Brook area, a late stage (post Devonian?), fine-grained muscovite-bearing granite was found. There appears to be a special relationship between the granite and tungsten anomalies. Fifteen heavy metal panned concentrates from the southern part of the claim group were analyzed for tin and tungsten. Regular silt samples (-80 mesh) were analyzed for Mo, Cu, Pb, Zn, Ag, Ni, Co, Mn, Fe, As, Au, Th, Sr, Cd, Sb, Bi, V, Ca, P, La, Cr, Mg, Ba, Ti, B, Ar, Na, K and W. In addition to the stream sediments, 836 soil samples were collected and analyzed for 26 elements. Several anomalous zones were delineated as a result of this work. An EM 16 Survey was done over the tungsten-copper anomalies that may be related to a silicified zone. An attempt to trench the anomalous zone did not succeed because of water problems and/or heavy overburden.

MAGAGUADAVIC ZONE

(2) **Brunswick Mining and Smelting Corp. Limited**

(t) Zealand Station 21 J/2W

Brunswick holds a claim group about 2 km west of Zealand Station, York County (21 J/2W).

The claim group is along the northeastern extension of the Devonian Pokiok Batholith and Silurian clastic metasedimentary rocks. The Lake George Sb-Au-W deposit occurs in similar sedimentary rocks about 26 km to the south.

During 1957 and 1962, beryl-tourmaline and molybdenite occurrences on the property were investigated by trenches and short pack sack drill holes. Ten bulk sediment samples were collected from the two streams draining the property. The samples were pan-concentrated in the field. Final concentrates were made by heavy liquid separation and they were analyzed for W, U, and Mo. In addition, 460 soil samples were collected from the

B-horizon, which were analyzed for W. A tungsten anomaly was found south of the Be-Mo occurrence.

(33) **Robert Connor and Ronald Morrison**

Upper Queensbury 21 G/14E

Robert Connor and Ronald Morrison continued prospecting for scheelite in their claim group at Upper Queensbury. The mineral occurrences appear to be associated with the youngest phase of the Pokiok Batholith.

(34) **Dallas Davis**

Magaguadavic 21 G/14E

Dallas Davis holds a claim group at Magaguadavic immediately south of the Pokiok Batholith, 58 km southwest of Fredericton. A heavy mineral survey of stream sediment and C horizon soils was conducted on part of the claim group. Anomalous values in arsenic, bismuth, cobalt, copper, gold, molybdenum, silver, tin and tungsten were found in the vicinity of a 20 gamma aeromagnetic anomaly, which may reflect a marginal granitoid stock similar to the one that was intersected by deep drill holes near the Lake George Antimony Mine.

ST. CROIX ZONE

(35) **Goldfluor Exploration Limited**

Central Tower Hill 21 G/6E

Goldfluor Exploration Ltd., owned by Reginald Cox of Saint John, continued prospecting in the Central Tower Hill area, northeast of St. Stephen. Arsenopyrite- and gold-bearing quartz veins cut across Ordovician sedimentary rocks in this claim group. Gold-bearing quartz veins have been found in several other locations in this area.

(37) **Peter Fernberg**

Mascarene Peninsula 21 G/2W

Peter Fernberg conducted IP, VLF-EM, Max-Min II and magnetometer surveys over his Mascarene Group, southwest of St. George. The IP anomalies were tested with two diamond drill holes. Pyrite, pyrrhotite with traces of galena, sphalerite and chalcopyrite were found in Silurian pelitic sedimentary rocks intercalated with mafic tuffs and agglomerates.

(13) Billiton Canada Limited

(e) Foster Lake 21 G/6E

In 1981, Shell Canada Resources Ltd. staked a group of claims in the Foster Lake area, along the northern contact of the Devonian Tower Hill granite pluton. This claim group was taken over by Billiton Canada Ltd. in 1982. Till samples were collected from the C horizons and heavy mineral concentrates were analyzed for W and Sn. B horizon samples were also analyzed for As, Mo, and some for Au. Geochemical anomalies for Sn and W were found in the exocontact zone of the pluton, but more work is required to determine the bedrock source of these anomalies.

(f) Pleasant Ridge 21 G/6E, 21 G/7W

This large claim group is situated between the Magaguadavic and Digdeguash Rivers, northeast of Rollingdam, Charlotte County. The group is underlain by Ordovician and Silurian sedimentary rocks that are intruded by the intensely fractionated Pleasant Ridge and Sorrell Ridge granite stocks of probable Caronbiferous age. Two short holes were drilled to test soil geochemical anomalies. Some greisenized granites were intersected, but these altered rocks contained no significant amounts of tin and tungsten.

MEX Exploration found a 3 m wide shear zone containing tin minerals, base metal sulphides, hematite and magnetite, that cuts across Silurian sedimentary rocks southeast of the Pleasant Ridge granite stock in this claim group. The deposit is hosted by Silurian greywacke and slate. No reports of further work on this deposit were submitted at the time of writing this report.

(g) Beech Hill-True Hill 21 G/7W

The Beech Hill-True Hill group of Billiton Canada Ltd. extends from Mount Pleasant westerly across the Piskahegan River and terminates at the Magaguadavic River. The group is underlain by Silurian sedimentary rocks of the Waweig Formation that are intruded by the Beech Hill and True Hill stocks of Early Carboniferous age.

Eight short holes were drilled in the Beech Hill granite stock and the metasedimentary rocks in its contact metamorphic aureole. A few selected samples from altered, pyritic, metasedimentary rocks and quartz veins assayed up to .13 Sn and .77 W.

Billiton also conducted a stream sediment and soil geochemical survey in the Silurian metasedimentary and Devonian and younger granitic rocks west and southwest of Mount Pleasant. At True Hill, in the northern part of this claim group, a tin-zinc-bearing silicified fracture and breccia zone was found in 1962 by Mount Pleasant Mines Ltd. The soil and stream sediment samples collected by Billiton were analyzed for tin, molybdenum, lead and zinc. Several northwest-trending lead-zinc anomalies with associated molybdenum were delineated. More work is required to determine the bedrock source of these anomalies.

Mount Pleasant 21 G/7W

Underground work and diamond drilling was continued in preparation of mining the tungsten-molybdenum deposit in the Fire Tower Zone. Mill construction was completed and testing of the different mill circuits was proceeding on schedule.

Disappointment Lake - Crystal Lake 21 G/7E

Billiton Canada Ltd. holds a large claim group about 18 km southeast of Mount Pleasant in the Eastern St. George Batholith. The only work reported for 1982 was concentrated on the ground optioned from W.J. Walton and M.J. Grant. Some till samples were collected for heavy mineral analysis. Anomalous Sn and W were found in a few samples. Cassiterite- and wolframite-bearing greisen veins were also discovered in the property.

(h) Square Lake

The Square Lake Claim Group of Billiton is about one kilometer west of Welsford, in the Eastern St. George Batholith. The area is underlain by a Lower Carboniferous, multiphase granitic complex.

In the vicinity of Square Lake, the granitic complex is cut by numerous tin-tungsten-bearing greisen veins. The veins consist of quartz, topaz, white mica and chlorite and small amounts of fluorite, wolframite, cassiterite, arsenopyrite, chalcopyrite, pyrite and molybdenite. The veins near Upper Tully Lake are relatively rich in pyrite and chalcopyrite, whereas fluorite and wolframite are more common in the Square Lake area.

A scintillometer was used to trace the zones of greisen veining, which generally have a higher radioactive background than the unmineralized granite. Trenches were bulldozed near Tully Lake and Square Lake to expose the greisen vein swarms. The vein swarms near Square Lake are up to 20 m wide and the average width is about 10 cm. In the Tully Lake area, the vein swarms are between 18 and 55 m wide and they generally vary in width from 8-16 cm. Two holes were drilled in the vicinity of Upper Tully Lake, but no ore grade material was intersected.

(39) John Stewart

Pleasant Ridge 21 G/7W

MEX Exploration Ltd. conducted a geochemical survey on the Stewart claims at Pleasant Ridge in northern Charlotte County. This work was done for Shell Canada Resources Ltd. which optioned the ground. Anomalous concentrations of tin and locally lead and zinc were found, but the bedrock source has not been established.

(40) **MEX Exploration Limited**

Pomeroy Bridge and Piskahegan Stream — 21 G/7W

MEX Exploration Ltd. conducted detailed geochemical and geophysical surveys and prospecting on claim groups in the Pomeroy Bridge and Piskahegan Stream areas, respectively, in the contact aureole of the Pleasant Ridge granite intrusion and north of the Beech Hill Stock.

In 1981, MEX geologists and prospectors found numerous tin and zinc mineral-bearing floats along the east side of Pleasant Ridge, which eventually led to the discovery of a 3 m wide shear zone containing tin minerals, base metal sulphides, hematite and magnetite. A total of 142 B horizon samples were collected and analyzed, but the results were not encouraging. However, the vein system was subsequently successfully delineated by using a magnetometer and trenching the magnetic anomaly. Prospecting on the claim group eventually led to the discovery of four zones containing tin minerals. Numerous mineralized float samples were found and they assayed between .08 and up to 6.7 per cent SnO_2. An extensive prospecting, geochemical, geophysical and diamond drilling program is needed, however, to find the source for the mineralized boulders.

Queens Lake — 21 G/7W

MEX explored a claim group east of Queens Lake, in the eastern St. George Batholith. The area is underlain by a Lower Carboniferous multi-phase granitic complex. Intense prospecting of the ground led to the discovery of an extensive greisen zone immediately south of Caribou Lake. Two types of greisen were observed: a) a light grey to white siliceous variety and b) a chlorite-hematite-bearing, sugary variety. The siliceous variety contains disseminated pyrite and molybdenite (up to .2% Mo) along with trace amounts of fluorite, chalcopyrite and arsenopyrite.

(41) **Canadian Nickel Company Limited**

(a) Bear Lake, Queens Lake — 21 G/7W

Canadian Nickel holds two claim groups at Bear Lake and Queens Lake, in the southeastern part of the St. George Batholith. The area is underlain by a Carboniferous polyphase granitic complex, which was mapped by the Geological Surveys Branch in 1976. In 1983, a 1:50,000 map was compiled using the 1976 maps and more recent data.

Tin-bearing greisen veins outcrop about 500 m west of Bear Lake. The veins cut across all phases of the granitic complex. Detailed mapping showed northeasterly and northwesterly striking sets of veins; the dips are subvertical in both sets. In places the northwesterly set is cut and displaced right laterally by the northeasterly set. Soil geochemical work delineated a few weak Sn anomalies. However, angular float found in the eastern part of the claim group assayed .85% Sn. It seems that heavy mineral analysis of tills rather than standard soil sampling procedures are necessary to detect tin anomalies.

(31) **B.P. Minerals Limited**

Nerepis Area 21 G/8W

The Nerepis property of B.P. Minerals is about 25 km northwest of Saint John and west of Highway No. 7. The Nerepis area has been intermittently explored by several companies for base metals, molybdenum, tin and tungsten from 1950 to the present. The B.P. prospect is immediately south of the Dolan Prospect, which also was optioned by the company. The propect is underlain by Silurian sedimentary rocks and mafic volcanics that are intruded by a Carboniferous multiphase intrusive complex.

The geology of the property was mapped and small amounts of pyrite and chalcopyrite were noted in numerous outcrops. Fluorite was commonly seen in greisen zones. Rock chip samples were analyzed for trace Sn, W, and Mo. Magnetic, VLF-EM and resistivity surveys also were done on the ground. As a result of the survey several greisen zones were found along an EM Conductor interpreted to be a northeast trending fault cut by two smaller northwest striking faults.

CENTRAL PLATFORM

(13) **Billiton Canada Limited**

Mud Lake 21 G/7W, 7E

This claim group is immediately east of Mount Pleasant. The area is underlain by Carboniferous felsic volcanic rocks. Billiton drilled three holes in an extensive, east-west striking, hydrothermally altered breccia zone. This breccia resembles altered breccias about 100 m above the Mount Pleasant tungsten-molybdenum deposit. Three short holes were drilled in the Mud Lake breccia zone but no metallic minerals of economic interest were intersected. It is possible though that metallic minerals occur deeper in the structure.

(42) **Uranerz Exploration and Mining Limited**

Duck Lake 21 G/7E, 10E

The Duck Lake claim group of Uranerz is situated along the eastern margin of the Mount Pleasant Caldera Complex, about 27 km south of Fredericton. The claim group is underlain by mafic and intermediate volcanic flows, fanglomerates and felsic tuffs of the Piskahegan Group.

The company conducted an extensive exploration program in the area that included: a) an airborne VLF-EM, magnetic and spectometer survey in the northern Mount Pleasant Caldera; b) ground radiometric, VLF-EM, IP and magnetic surveys; c) radiometric boulder tracing; d) trenching and blasting; e) geochemical; and f) detailed mapping of the trenches and petrological investigations. The radioactive rocks all occur in the intermediate volcanic flows that have been intensely altered by hematite. In

order to determine the economic potential of the property a detailed diamond drilling program is required.

CALEDONIA ZONE

(54) **Gordex Minerals Limited**

(a) Cape Spencer 21 H/4W

This gold prospect is about 400 m west of the lighthouse at Cape Spencer, southeast of Saint John. An extensive program of trenching and shallow diamond drilling led to the delineation of a hydrothermally altered gold-bearing zone, about 200 m by 400 m. The hostrocks are intensely deformed Upper Precambrian sedimentary rocks intruded by granite. There is evidence for at least two episodes of vein emplacement. The oldest gold-bearing veins are roughly concordant with the folded penetrative cleavage. These veins are locally cut by northwest or east-west striking, steeply dipping and more hematite-rich gold-bearing quartz veins that generally are higher grade.

(44) **Goldfluor Exploration Limited**

Dipper Harbour 21 G/1W

The Dipper Harbour gold prospect is along the Bay of Fundy coast, about 35 km southwest of Saint John. Intensely brecciated, quartz veins up to about 3.5 m wide with chalcopyrite, galena and gold cut Carboniferous sandstone and siltstone. Grab samples of these mineralized veins assay in places up to 1.3 ounces gold per ton. The gold-bearing veins in this area were found by Mr. Reginald Cox, the owner of Goldfluor Explorations Ltd.

(55) **Cuvier Mines Inc.**

West Bay 21 H/4W, 5W

Cuvier Mines staked a group of claims northeast of the Cape Spencer prospect. This ground was staked because of the discovery of angular gold-bearing float that assayed in excess of one ounce per ton.

(2) **Brunswick Mining and Smelting Corporation Limited**

(v) Quispamsis 21 H/5W

This property is underlain by granodiorite, diorite and minor granite of Silurian or younger age, and Mississippian or older clastic sedimentary rocks and minor limestone. Base metal sulphides occur in shear zones in the granite and Precambrian limestone inclusions. The ground was prospected and rock samples were analyzed for Cu, Pb, Zn, Ag, and Au. Soil samples were analyzed for Cu, Pb, Zn, and Ag and several anomalies were delineated.

MONCTON-CUMBERLAND BASIN

(59) **Potash Company of America**

Plumweseep-Penobsquis Concession 21 H/11W, 14W, 14E

Potash Company of America continued work in preparation of production of their potash-salt deposit near Sussex. The production shaft was about 60 percent completed. In addition, a seven foot by seven foot raise was driven from the 1900 foot level for 450 feet beneath the production shaft (under construction). The surface plant was about 80 percent completed. The head-frame for the surface shaft was completed and it was used to lower mining equipment into the mine.

(57) **Denison Mines Limited**

Salt Springs Concession 21 H/12E

Denison Mines completed the exploration shaft in their Salt Springs potash-salt deposit. The deposit was delineated by a cross-cut, drifts and underground drilling. The underground exploration program successfully outlined a mineable deposit. Denison Mines Ltd. and its partner Potash Company of Canada Ltd., a company jointly owned by Enterprise Miniere Chenique (France) and Kali und Salz Ag (West Germany) subsequently decided to proceed with bringing the deposit into production.

(58) **B.P. Exploration Canada Limited**

Millstream 21 H/12E, 12W

B.P. Canada continued a drilling program in the Millstream potash-salt deposit. At the end of 1982, the company had successfully completed 9 diamond drill holes.

(36) **A.W. Lockhart**

Campbells Settlement 21 H/12E

This high grade silica sand deposit is immediately east of Cassidy Lake and 7 km east of the Denison Potacan mine. Two holes, spaced 800 feet apart, were drilled to a vertical depth of more than 200 feet. A.W. Lockhart estimated that the deposit contains ten million tons proven and over 25 million tons indicated silica sand. Assays of the untreated sand indicate 98 to 99 percent SiO_2 with low impurities.

MINERAL OCCURRENCES

Work was reported on the following deposits in 1982:

CAPTAIN SULPHIDE DEPOSIT — 21 P/5W
Gloucester County, New Brunswick

DEVELOPMENTS Mining licence inadvertently lapsed November, 1982. Staked by Brunswick Mining and Smelting. One claim over sulphide body also staked by A. White for Mr. B. Wilson, and its ownership has not been settled.

FLAT LANDING BROOK SULPHIDE DEPOSIT — 21 P/5W
Gloucester County, New Brunswick

LOCATION Lat. 47°22.9'N; Long. 65°52.6'W - approximately 25 miles southwest of Bathurst. Accessible via Highway 430.

HISTORY AND DEVELOPMENT Discovered in 1975 on a large property (417 claims) selected because of favourable geology. Massive sulphide float discovered in vicinity of airborne "input" anomaly (so-called "No. 11 area"). Ground geophysical surveys pinpointed target. Drilling carried out in 1975 and 1976. Management of exploration turned over to Essex by Sabina in September, 1976. Essex dropped their option in 1978. The property was optioned to Brunswick Mining and Smelting Corp. Ltd. in 1980 (see below).

COMPANY Sabina Industries Limited (Vancouver, S.E.); Executive Office - 307, 8 King Street East, Toronto, Ontario, M5C 1B5. President - J.K. Campbell; Managing Director - W.W. Cummins. Authorized 5,000,000 shares. Issued 3,044,005 (135,000 escrowed). Brunswick Mining and Smelting Corp. Ltd., P.O. Box 45, Suite 4500, Commerce Court West, Toronto, Ontario, M5L 1B6. Senior Vice President - A. Powis.

PROPERTY 417 claims (12,000 acres) optioned includes three packages (1) Sabina, 367 claims; (2) Smyth Option, 44 claims (includes M.L. 1171); (3) Duffy Option, 6 claims. (Now Mining Licences 1273, 1171 and 1248.)

PRODUCTION None.

FINANCIAL Optioned in 1975 to Essex Minerals who spent approximately $1.8 million in exploration up to 1978. B.M.&S. can earn 70% interest by cash payments of $250,000 and expending $1,850,000 on exploration to July 14, 1984.

RESERVES

	Probable Tonnage	Cu %	Pb %	Zn %	Ag oz/ton
North Zone	900,000	0.04	1.71	6.94	0.89
South Zone	500,000	0.02	0.53	3.23	0.31

DEVELOPMENTS, 1982 Eleven diamond drill holes were put down by Brunswick Mining and Smelting Corp. Ltd. in 1981-82. The results indicate two and possibly three sulphide zones, and were encouraging enough for B.M.&S. to decide in October, 1982 to continue their option. A large amount will be expended in 1983.

OUTLOOK Substantial extra tonnage will have to be found to make a mineable deposit.

HALFMILE LAKE SULPHIDE DEPOSIT

21 O/8W

Northumberland County, New Brunswick

LOCATION Lat. 47°25'N; Long. 66°19'W - located 19 km (12 miles) west of Heath Steele. Access is via Highway 430 and secondary roads.

HISTORY AND DEVELOPMENT Discovered in 1955 by Texasgulf (Middle River Mining Company) as a result of a regional geological approach followed by airborne EM and follow-up ground EM. Bay Copper Mines found the down dip extension by drilling. Mineral dressing experiments carried out with limited success. Option agreement reached between two companies in 1974. Deep drilling program begun and continuity of sulphide body confirmed at depth. Consideration given in 1976 to 2,800-foot exploration shaft but plans were shelved. Optioned to Billiton in 1979 (see below).

COMPANY Kidd Creek Mines Ltd., P.O. Box 175, Suite 5000, Commerce Court West, Toronto, Ontario, M5L 1E7. Chairman - P.R. Clark; President - M.P. Amsden (7).

Bay Copper Mines Ltd., 1010 Richmond Street West, Toronto, Ontario, M5H 2G1. President - M.P. Connell (controlled by Conwest Exploration Ltd. (79.6%)

Billiton Canada Ltd., 2802 - 130 Adelaide Street West, Toronto, Ontario, M5H 3P5. President - J.W.G. Gilbey; wholly-owned subsidiary of Billiton B.V., The Hague, Netherlands.

PROPERTY Mining Licences 998 and 1010.

PRODUCTION None

FINANCIAL Bay Copper Mines Limited assigned their part of the sulphide deposit in 1974 to Kidd Creek Mines (formerly Texasgulf Inc.). Kidd Creek Mines were to spend $100,000 per year for five years and, if brought into production, Bay Copper would retain 10% net operating profits. If the option were retained beyond five years without production, Kidd Creek would pay advance royalty of $25,000 per year.

Billiton obtained an option in 1979 and could earn 50% interest. Bay Copper royalty was preserved, and the company received payments in 1979 and 1980. Billiton have now earned the 50% interest.

RESERVES (up to 1982)

	Tonnage	% Cu	% Pb	% Zn
Kidd Creek	5,200,000	0.39	2.49	6.57
	1,000,000	2.00		
Bay Copper	1,600,000	0.32	2.9	7.7

RESERVES (1982-83 Mines Handbook - according to Bay Copper Mines)

Tonnage	% Cu	% Pb	% Zn	Ag oz/ton
11,200,000	0.17	2.6	7.51	0.9

This presumably includes the entire sulphide body; however, there is no mention of copper ore tonnage listed above.

DEVELOPMENTS, 1982

1975 - 24,753 feet (7544 m) drilling by Kidd Creek
1980-81 - 70,000 feet (21 336 m) drilling by Billiton

Large number of claims staked by Billiton around mining licences in 1981. Exploration work carried out in 1981-82.

OUTLOOK Sulphide body seems to be well delineated, and tonnage figures are up considerably since 1975. The next logical step appears to be an exploration shaft or decline.

PATAPAT BROOK SULPHIDES — 21 P/13W

Restigouche County, New Brunswick

DEVELOPMENTS, 1982 TO JANUARY, 1983 Mining licence inadvertently lapsed in late 1982. Three parties in staking--J.W. McCarthy, N. Pitre, and R. Archibald. Ownership to be settled by Mines Commissioner.

RESTIGOUCHE SULPHIDE DEPOSIT — 21 O/7, 21 O/10

Restigouche County, New Brunswick

LOCATION Lat. 47°30,2'N; Long. 66°33.5'W - accessible via Roads to Resources approximately 60 km (38 miles) west southwest of Bathurst.

HISTORY AND DEVELOPMENT Property initially staked by Selco in 1954 because of strong base metal anomalies in streams draining the area. The property was optioned to New Jersey Zinc Company in 1957 who discovered the sulphide deposit by drilling a strong soil geochemical anomaly. The new company, the Restigouche Mining Corporation (mainly New Jersey Zinc), optioned the property to Teck Corporation (Keevil Mining Group) in 1965. After several drill holes and metallurgical tests, Teck dropped their option in 1970. In 1972 the property was optioned to Gowganda Silver Mines who sold most of their interest to Placer

Development in 1974. Placer optioned this deposit to Billiton in 1980, who dropped it in 1982.

COMPANY Placer Development Limited, 1600, 1055 Dunsmuir Street, Vancouver. Chairman - T.H. McClelland (Noranda Mines holds 33% interest). Gowganda Resources Inc. (formerly Gowganda Silver Mines), 702, 45 Richmond Street West, Toronto, M5H 1Z2. President - J.M. Stirling.

PROPERTY Held as Mining Licence 1237 (6766.35 acres).

PRODUCTION None.

FINANCIAL Placer Development presumably holds 76% interest and Gowganda Resources holds 24% interest.

RESERVES

	Tons x 10^3	Cu%	Pb%	Zn%	Ag oz/ton
	2,619	0.34	5.5	6.8	3.0
or	3,260		4.6	5.9	

A bulk concentrate, prepared by Teck Corporation, had the following composition: 19% Pb, 28% Zn, 1.2% Cu, 0.05% Cd, 9 oz/ton Ag, 0.02 oz/ton Au, 15% Fe, 0.04% As, 0.006% Sn.

DEVELOPMENTS, 1982 TO JANUARY 1983 An item in the Northern Miner last June (1982) reported two sulphide intersections in a Billiton drill hole at the north end of the Restigouche deposit. The first comprised 72 feet, 0.35% Cu, 6.19% Pb, 8.2% Zn and 2.6 oz/ton Ag. The second deeper intersection was 56.5 feet wide and assayed 0.35% Cu, 3.8% Pb, 6.9% Zn and 3.56 oz/ton Ag. It is not known if this drill hole increased the previously calculated tonnage. Billiton dropped their option in late 1982. Thirty-seven thousand feet of drilling apparently did not improve the tonnage picture. Unofficial report indicates Placer Development will sell their interest for $2,000,000.

OUTLOOK This deposit probably could be mined profitably when metal prices improve.

STRATMAT DEPOSIT

21 O/8E

Northumberland County, New Brunswick

LOCATION

Main (East) Zone	-	Lat. 47°19'11";	Long. 66°06'31"
Central Zone	-	47°18'42";	66°07'07"
West Zone	-	47°18'31";	66°08'03"
Stringer Zone	-	47°16';	66°08'25"

HISTORY AND DEVELOPMENT The Stratmat deposits are located approximately 4 km (2.5 miles) northwest of Heath Steele, in Northumberland County. Access is via Highway 430. The Main or Stratmat (East) Zone was discovered by Strategic Metals in 1956 following geophysical surveys. Strategic drilled holes 61-1 to 61-36 in 1956-57, but optioned the property to Cominco Limited in 1959. Cominco exploration led to the discovery of the West

Zone in 1961, and the Stringer and Central Zones in 1972. The West Zone lies on the boundary between the Heath Steele and Cominco properties (see reserves).

COMPANY Cominco Limited: Executive Office - 200 Granville Square, Vancouver, British Columbia, V6C 2R2. Chairman - F.E. Burnett, Vice President, Eastern Region - J.R.M. Douglas.

PROPERTY Two Mining Licences 1007 and 1008 (2,004 acres), adjoining Heath Steele mining lease.

PRODUCTION None.

FINANCIAL Original discovery (Main Zone) was purchased from Stratmat in 1959 for $100,000 advanced royalties. Cominco purchased remaining royalty rights for $1,000 in 1970.

RESERVES

	Tonnage	Cu%	Pb%	Zn%	Ag oz/ton
Main Zone	700,000	0.03	1.8	5.2	1.9
	500,000	1.9			
Central Zone	200,000+	0.5	4.3	8.0	
Stringer Zone	200,000+	2.0			
West Zone (Main)	1,600,000		2.9	7.5	0.9
East Zone (Depth)	400,000	0.7	.6	12.2	0.7
Heath Steele					
West Zone A					
N-2 (at depth)	600,000	0.5	3.6	9.6	2.3
N-5	600,000	0.5	3.2	8.0	0.9

DEVELOPMENTS, 1982 Orientation of drill holes was a major problem that made interpretation very difficult. This apparently has not been overcome. Mineral dressing tests at Heath Steele were very successful.

OUTLOOK These deposits will probably be mined in the near future if metal prices continue to rise. Metallurgical problems are minimal and the short distance to the Heath Steele mill is an attractive feature. However, takeover of Heath Steele by Noranda interests may change what looked like a possible Cominco-Heath Steele arrangement.

TURGEON (BELLEDUNE) DEPOSIT — 21 P/13W

Gloucester County, New Brunswick

LOCATION Lat. 47°52.6'N; Long. 66°52.6'W - located near the new Highway No. 11, approximately 4 km from Belledune.

HISTORY AND DEVELOPMENT Initial claims were staked in the 1952-55 "rush". C.A. Willett and J.W. McCarthy came into the picture in 1957 when they discovered a Zn-Cu showing (Esso's "Beaver Pond showing"). M.J. Boylen Ltd. optioned the property in 1958, followed by Noranda in 1959 and Rio Tinto in 1960. Various EM and magnetic surveys were carried out. Trenching and di-

amond drilling (two holes by Noranda and four holes by Rio Tinto) revealed a small low-grade sulphide lense. McCarthy and Willett discovered an additional chalcocite showing in 1964 and optioned the claim group to Industrial Mineral Exploration Limited. Property converted to Mining Licence 1155 in 1967 and a new company was formed (Heron Mines Limited). VLF-EM, SP, IP, resistivity, magnetic, gravity and soil geochemical surveys have been carried out by Heron Mines. Ten diamond drill holes have been put down, but only the last three (77-1, 77-3, 77-4) intersected what appears to be the main massive sulphide deposit (Esso's "Power-line showing"). Property optioned to Esso Minerals Canada in 1978. They have drilled 23 holes up to February, 1981.

GEOLOGY The two main sulphide showings (Power-line and Beaver Pond) occur in altered Fournier Group pillow basalt ("Basalt-andesite") near a contact with highly altered felsic pyroclastic rocks (Keratophyric?), ("rhyolite-dacite" according to Esso). Esso reports the sulphides in the Power-line showing occur as lenticular pods and fracture fillings comprising pyrite, chalcopyrite and sphalerite. The Beaver Pond showing appears to be a saucer-shaped mass consisting of 300-500 tonnes of pyrite, sphalerite and chalcopyrite.

COMPANY Heron Mines Limited (Industrial Marine Limited, Suite 1906, 375 Park Avenue, New York, N.Y., U.S.A. 10022). Company Official - John Carroll. Original Owners - C.A. Willett and J.W. McCarthy, each thought to have 150,000 shares of Heron Mines.

PROPERTY Mining Licence 1155 and sixty-two (62) surrounding claims owned by Heron Mines Limited and Joseph Porter (consultant) are now under option to Esso Minerals. These are in turn surrounded by about 178 claims staked by Esso Resources Limited and Imperial Oil Limited.

PRODUCTION None.

RESERVES Rough estimate based on drilling to date (February, 1981).

Tons	Zn%	Cu%
500,000	4.0	1.5

DEVELOPMENTS, 1982 Over 60,000 feet of drilling, as well as stripping and geological and geophysical surveys, has been carried out by Esso. A significant, but small, Cu-Zn sulphide deposit has been outlined; however, the tonnage target figure, presumably 3,000,000 tonnes, has not been reached. Esso terminated their agreement in late 1982. Esso personnel arranged for the transfer of the diamond drill core to the Mineral Resources core storage building at Madran in early 1983.

NEW HORTON COPPER-URANIUM — 21 H/10E
Albert County, New Brunswick

DEVELOPMENTS, 1982 Gulf Minerals allowed the claims to expire.

GOSHEN COPPER — 21 H/14E
Albert County, New Brunswick

LOCATION The Goshen copper deposit is situated one mile southwest of Goshen, Albert County.

HISTORY The deposit was found in 1925 and it has been worked intermittently since that time. Oakwood Mines Ltd. trenched and sampled the deposit extensively between 1955 and 1956.

COMPANY The property is presently held by Omni Mines Ltd. and managed by A.W. Lockhart.

PROPERTY AND DEVELOPMENT The zone is fully delineated by trenching and diamond drilling.

EMPLOYEES A.W. Lockhart works the property intermittently with the objective of developing a small-scale mining operation.

PRODUCTION POSSIBILITIES It may be possible to develop a small-scale inexpensive open cast mining operation.

RESERVES AND GRADE Reserves are estimated at 25,000 tons grading 2.35% copper.

DEVELOPMENTS, 1982 The overburden was stripped over part of the mineralized zone.

OUTLOOK The deposit may support a small open cast mining operation when the price of copper becomes attractive. The presence of this deposit has also stimulated exploration for larger deposits of this type in the area.

NEREPIS ZINC-LEAD-COPPER-TIN — 21 G/8W
Saint John County, New Brunswick

LOCATION The deposit is situated west of Nerepis on Highway 2A, south of Welsford, Saint John County.

HISTORY Base metal sulphides were first found in the area around 1864. A narrow high grade vein found by a local prospector in 1954 was drilled by Fundy Bay Copper Ltd. In 1959 the property was staked by Crystal Ice Ltd. and optioned in subsequent years by Rio Tinto, Frank Joubin and Associates and Merrill Obalski Ltd. Merrill Obalski first discovered tin on the property.

COMPANY The Dolan prospect and surrounding area were explored by BP Minerals, a wholly-owned subsidiary of BP Canada Inc.

PROPERTY AND DEVELOPMENT Diamond drilling and ground geophysical surveys were carried out in several selected areas.

EMPLOYEES BP employed a geologist on the property throughout the summer.

PRODUCTION POSSIBILITIES This is one of the better base metal-tin prospects in southern New Brunswick.

FINANCIAL Various exploration programs conducted on the property since 1956 probably amount to about $180,000.

RESERVES AND GRADE Diamond drilling in 1969 intersected about 8.0 feet grading 8.5% zinc, but available drilling data is insufficient to make a tonnage estimate at the present time. Tin minerals (up to 0.7% Sn) accompanied by base metal sulphides occur in metasedimentary rocks along the contact of lower Carboniferous granite.

DEVELOPMENTS, 1982 BP conducted geologic mapping, soil and rock geochemistry, magnetic, electromagnetic and resistivity surveys on the property during 1982. Several greisen zones favourable for tin and tungsten minerals were found and more detailed follow-up work was recommended.

VICTORIA-MISTAKE LAKE AREA 21 G/7W
Charlotte County, New Brunswick

LOCATION This tin-bearing mineralized zone is situated about 11 miles southeast of Mount Pleasant.

HISTORY Greisen veins and sulphide-bearing rocks were first found in the area in the course of a geologic mapping program conducted by the Mineral Resources Branch (Sussex Regional Office) in 1975. Follow-up of this mapping program by MEX Exploration led to the delineation of a tin-bearing greisen zone in 1980. MEX Exploration then transferred the property to Shell Canada Resources Ltd.

COMPANY The property is presently held by Billiton Canada Ltd.

EMPLOYEES The company employed a geologist and sampling crew on the property during the summer.

PRODUCTION POSSIBILITIES The property has considerable mineral potential, but an extensive diamond drilling program is required to delineate a possible economic ore zone.

FINANCIAL Shell Canada Resources has expended about $190,000 on the property.

RESERVES AND GRADE Reserves and average grade of this mineralized zone are not known at this time.

DEVELOPMENTS, 1982 An extensive till sampling program and detailed geologic mapping were carried out by Shell Canada Resources in 1981, but no new developments were reported in 1982.

OUTLOOK The prospect resembles the tin-tungsten deposit found by Shell Resources Ltd. in the South Mountain Batholith near Yarmouth, Nova Scotia. The possibilities for an economic ore deposit are quite good.

TRUE HILL TIN-BASE METAL — 21 G/7W
Charlotte County, New Brunswick

LOCATION The True Hill property is situated about two miles west of Mount Pleasant, Charlotte County.

HISTORY The first tin-zinc showing was discovered on the property in 1962. No further work was done until it was restaked in 1978 by Beth-Canada Limited.

COMPANY Billiton Canada Ltd. Dr. J.W.G. Gilbey is president of the company.

PROPERTY AND DEVELOPMENT Two holes were drilled in the northern part of the property in 1962 intersecting tin and zinc minerals of economic interest. Detailed surface investigation by Beth-Canada led to the discovery of two tin-bearing zones on the property. The company drilled a few holes in 1980, but the results were not made public. The property was purchased by Billiton Canada Ltd. in 1982.

PRODUCTION POSSIBILITIES This is one of the better tin properties in southern New Brunswick. More work is required, however, to establish the presence of a mineable orebody.

FINANCIAL About $200,000 has been spent on exploration of the property over the years.

RESERVES AND GRADE These are not known at the present time.

DEVELOPMENTS, 1982 Billiton Canada Ltd. purchased the claims in 1982. No results of work carried out were announced.

OUTLOOK Present geologic evidence indicates that the property has considerable potential for an economic tin deposit. This is particularly interesting because the property is close to Mount Pleasant and the ore could be treated in the Mount Pleasant mill.

CAPE SPENCER GOLD — 21 H/4W
Saint John County, New Brunswick

LOCATION The Cape Spencer gold deposit is about 10 km southeast of Saint John, along the Bay of Fundy coast.

HISTORY Minor amounts of gold were found near the Cape Spencer lighthouse several years ago. An intensive exploration program conducted during the summer of 1982 led to the delineation of an extensive alteration zone with numerous gold-bearing quartz veins.

COMPANY The property is held by Gordex Minerals Ltd. Mr. Morton Gordon is manager of this company.

PROPERTY AND DEVELOPMENT The overburden has been removed over part of the mineralized zone, and numerous short holes have been drilled.

EMPLOYEES In addition to Mr. Gordon, several local men were employed on the property during the summer months.

PRODUCTION POSSIBILITIES C.W. Archibald, a Toronto geological consultant, stated that the possibility of mining a large open pit area at Cape Spencer appears extremely promising. There are also indications that veins carrying higher grade material can be delineated which could support an underground operation.

FINANCIAL The exact amount of money expended on the property is not known, but it is probably in excess of $50,000.

RESERVES AND GRADE The area that has been sampled to date is estimated to contain 1,180 tons per vertical foot of material assaying just over 0.10 ounces of gold per ton. No attempts have been made yet to delineate veins containing higher grade material, although assays of 0.586 ounces per ton are locally reported.

DEVELOPMENTS, 1982 Detailed sampling and shallow diamond drilling of the cleared area was carried out during the summer. The geology of the entire gold-bearing zone was mapped during the summer by the Geological Surveys Branch.

OUTLOOK The possibility for open pit mining of a large low grade deposit is promising. Moreover, there are indications that higher grade veins could be delineated, which could support an underground operation.

ANNIDALE COPPER-GOLD 21 H/13W
Kings County, New Brunswick

LOCATION The Annidale copper deposit is about one mile south of Annidale, Kings County.

HISTORY Copper sulphides were first found in the Annidale area around 1900. Between 1902 and 1922, several short shafts and pits were sunk in the deposit. American Metals Mining Company and New Brunswick Copper Corp. drilled part of the deposit between 1951 and 1955. Cities Service uncovered part of the deposit in 1969. In addition, this company discovered an intensely altered mafic igneous complex cut by numerous quartz-carbonate veins in the western part of the property. Low-grade gold, up to .07 ozs. per ton, was found locally in samples collected from this zone by geologists of the Geological Surveys Branch and prospectors presently holding the claim group.

COMPANY The property is presently held by M.J. Grant and W.G. Walton.

PROPERTY AND DEVELOPMENT About 6,800 feet of drilling was carried out and three small shafts provide access to part of the deposit.

PRODUCTION POSSIBILITIES Around 1920, two carloads of high-grade copper ore were sold from the mine. Present drill-indicated ore is probably insufficient to support a mining operation, but the drilling was inadequate to determine the limits of the deposit. Detailed sampling for gold at the altered zone in the western part of the property could delineate an economic gold deposit. This possibility is supported by the fact that fracturing and alteration are very intense throughout this zone. Moreover, chromium-bearing mica, the main alteration mineral, is common in numerous gold mines throughout the world.

FINANCIAL It is difficult to estimate the amount of money expended on exploration, but it was probably in the order of $100,000.

RESERVES AND GRADE Drill-indicated reserves are about 100,000 tons grading between .02% and .07% copper. This tonnage may be increased when the limits of the deposit are determined with additional drilling.

DEVELOPMENTS, 1982 A few additional samples collected by the prospectors who presently hold the claim group confirmed the presence of gold in the altered zone in the western part of the property.

OUTLOOK It is possible that further drilling may prove up more ore. The presence of this high-grade deposit intermittently activates exploration activity in the Annidale area when the price of copper is favourable. Exploration of the alteration (mainly chromium-mica) in the western part of the property may result in the discovery of an economic gold deposit.

DUCK LAKE URANIUM 21 G/7

Charlotte and Sunbury Counties

LOCATION The Duck Lake uranium prospect occurs in Carboniferous volcanic rocks, about 27 km south of Fredericton.

HISTORY Uranerz found a well-defined uranium anomaly in this area during 1981. Detailed investigation of the glacial dispersion pattern of radioactive boulders in the anomalous zone led to the discovery of radioactive material in bedrock.

COMPANY Uranerz Exploration and Mining Ltd. Dr. W. Brack is in charge of the project.

EMPLOYEES Field work was carried out by six men throughout the summer season. In addition, various specialists were employed for short periods.

PRODUCTION POSSIBILITIES More work is required to determine the economic potential of the prospect.

FINANCIAL About $105,000 was expended on the property.

RESERVES AND GRADE A drilling program to determine reserves and grade of the deposit is planned for 1983.

DEVELOPMENTS, 1982 Work during 1982 included line cutting, boulder mapping and glacial study, emanometric VLF and magnetic surveys, and extensive trenching.

OUTLOOK Preliminary results are encouraging. This area has potential for both uranium and gold deposits.

Work was not reported on the following deposits in 1982:

Captain (North) Deposit	21 P/5W
Key Anacon Sulphide Deposit	21 P/5W
Murray Brook Sulphide Deposit	21 O/9(d)M-6
Upsalquitch Prospect	21 O/8W
Teahan Copper-Zinc-Lead	21 H/10W
Adam's Island Copper	21 G/2W, 21 B/15W
Evandale Copper-Molybdenum	21 G/9
New Horton Copper-Uranium	21 H/10E
Midway Copper	21 H/10W
Dorchester Copper-Uranium	21 H/15, 21 H/16
St. Stephen Nickel	21 G/3W
Deer Lake Tungsten	21 G/7W
Blind Lake Tin	21 G/7W
Pleasant Ridge Tin	21 G/7W
Shin Creek Molybdenum-Tungsten-Uranium	21 G/10E
York Mills Uranium	21 G/11E
Jordan Mountain Copper-Uranium	21 H/14W
Lower Millstream Uranium	21 H/12E

CHAPTER 4. ENERGY RESOURCES AND PEAT

Coal, oil and natural gas were produced in New Brunswick as energy resources at approximately the same level as in previous years. Peat for horticultural purposes has shown an increase in production.

The value of energy resources produced in New Brunswick in 1981 was approximately $42,658,600 including peat moss.

OIL

Irving Oil Ltd. continued to produce oil from the Stoney Creek field with a total production of 650 barrels in 1982.

The original reservoir characteristics indicated an in place reserve of 17.7 million barrels with an indicated 2.6 million barrels recoverable. To the end of 1980 some 782,184 barrels have been produced, thus suggesting that 1.8 million barrels remain to be recovered.

The production history for Stoney Creek is as follows:

Date	Production (barrels)
1907-1974	748,945
1975	7,166
1976	5,443
1977	5,146
1978	5,093
1979	4,570
1980	3,800
1981	2,020
1982	650

There are two restrictions on production: antiquated equipment and lack of market, the latter of which has reversed near the end of 1982.

NATURAL GAS

Moncton Utility Gas Limited continues to produce natural gas at Stoney Creek and are supplying some 535 customers at present.

The original recoverable reserves calculated for the field were 27 billion cubic feet (bcf), and 27.9 bcf have been produced to date. Thus either the initial recovery factor utilized was incorrect or there was more gas in place than calculated.

The production history for the field is as follows:

Date	Production (MCF)
1909-1974	27,576,214
1975	90,774
1976	100,345
1977	85,639
1978	92,565
1979	97,471
1980	79,388
1981	71,936
1982	59,036

COAL

N.B. Coal Limited, in the Minto-Chipman area, remained the sole producer of coal in 1980 with a production of some 498,480 tonnes. The sole market for the coal was N.B. Power (Figure 17).

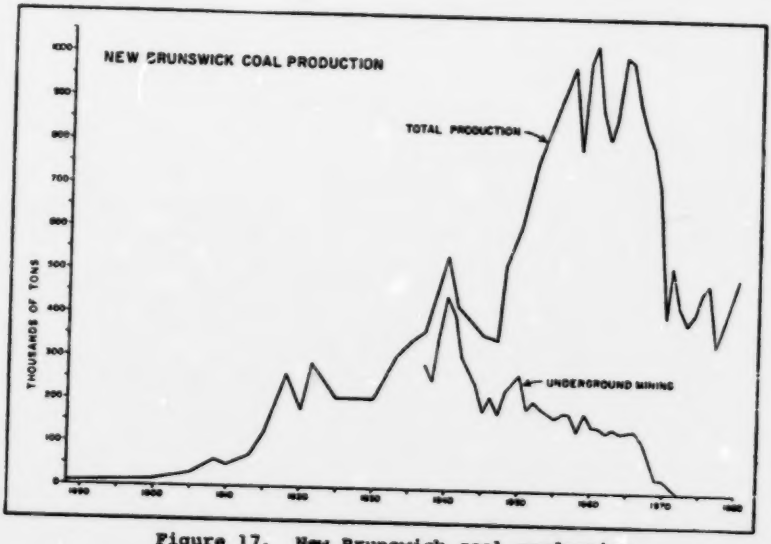

Figure 17. New Brunswick coal production

URANIUM

Activity in the exploration for uranium decreased substantially with only a few companies maintaining claims.

At present there has been encouragement but no significant finds to date. It is anticipated that exploration for uranium will continue in the future on this reduced scale.

PEAT

Thirteen companies, mainly based in the northeastern area of New Brunswick, produced 4,500,000 bales (six cubic foot) in 1982. The main market was in the eastern seaboard of the United States, Quebec and Ontario. The marketability of peat moss has softened and resulted in a decrease in applications by companies or individuals to develop peat moss. Four new companies are preparing for production in 1983. The 13 producing companies are listed below.

Acadian Peat Moss Co. Ltd. (Lameque, N.B.)
Atkins & Durbrow (P.O. Box 88, Lower Caraquet, N.B.)
Fafard Peat Moss Company Limited (P.O. Box 70, Shippagan, N.B.)
Grande Anse Peat Moss Company Limitied (Grande Anse, N.B.)
Heveco Limited (P.O. Box 30, Tabusintac, N.B.)
Lameque Peat Moss Limited (Lameque, N.B.)
Portage River Peat Moss Company Limited (Portage River, Northumberland County, N.B.)
Theriault and Hachey Limited (Eel River Bridge, Parish of Hardwick, N.B.)
Western Peat Moss Company Limited (Maisonnette, N.B.)
Atlantic Peat Moss Company Limited (Lameque, N.B.)
A.S.B. (Canada) Ltd. (Pointe Sapin, N.B.)
La Tourbe Pigeon Hill Ltd. (Lameque, N.B.)
La Tourbiere Saint Raphael (Lameque, N.B.)

CHAPTER 5. INDUSTRIAL MINERALS

PRODUCING MINES

LIMESTONE AND DOLOMITE

Brookville Manufacturing Company Limited

Brookville Manufacturing Company Limited operates a quarry in East Saint John producing about 100,000 tonnes of agricultural dolomite and 200,000 tonnes of construction aggregate annually. The quarry has been operating continuously for over 60 years in what was formerly known as the Lawlor quarry. Reserves are estimated as adequate for at least 10 years at present rate of consumption although the Company has been subjected to increasing land-use pressures in recent years.

Market demand is directly related to construction activities as well as climatic conditions in spring and fall for lime application.

Elmtree Resources Limited

Elmtree Resources Limited operates a limestone quarry located about 20 km north of Bathurst near the Village of Petit Rocher, Gloucester County. A quarry has existed on this site since 1880 and was operated on a 2,000 ton/year basis from 1930 to 1960 by Elmtree Co-op. Since 1960 it was operated on an intermittent basis until 1978 when it was acquired by Elmtree Resources Limited. Following extensive trenching and mapping, the quarry was expanded to include a crushing, screening plant and a large storage facility. Reserves have been estimated at about 7.0 million tonnes with a cut-off grade of 50% CaO although recent trenching south and east of the existing quarry has indicated that the highest quality stone is restricted to a number of limestone lenses.

In 1982, about 50,000 tonnes of limestone was quarried, crushed and sold as smelter flux to Brunswick Mining and Smelting Corporation Limited for use in their lead smelter. Agricultural lime and construction stone were also produced in 1982.

In 1982 Elmtree Resources Limited conducted successful exploration programs at Armstrong Brook and Sormany, locating "ag lime" grade dolomite and chemical grade limestone. More details are included under "properties recently explored".

Canada Cement LaFarge Limited

Canada Cement LaFarge Limited operates a limestone quarry at Havelock, Kings County producing about 300,000 tonnes annually for use in cement manufacture. The quarry has been supplying raw material to the nearby cement plant since 1952 and present reserves are adequate for at least 10 years at present rate of consumption. More recently the quarry has also supplied

raw material to Havelock Processing Limited for use in quicklime production.

Canada Cement LaFarge Limited also holds extensive reserves of limestone, estimated in excess of 100 million tonnes, to the east of the present quarry as well as at Springhill.

Present cement market conditions look bleak for continuous cement production at Havelock due to the present weak demand resulting from low-construction activity. In 1982 the plant only operated for part of the year.

Havelock Lime Works Limited

Havelock Lime Works Limited operates a limestone quarry at Samphill, Kings County, producing about 300,000 tonnes annually for use in quicklime manufacture, "ag lime", and general construction stone. The quarry is located about 5 km southwest of Havelock and is estimated to contain less than 1 million tonnes of chemical-grade limestone. Quarrying has taken place since 1969, but the more recent output from this site has been supplemented by purchase of stone from the Canada Cement LaFarge Limited quarry.

Future quicklime manufacture by Havelock Processing Limited will require Havelock Lime Works Limited reaching an agreement with Canada Cement LaFarge Limited to obtain chemical grade stone from areas presently held under their mining licence.

SILICA

Chaleur Silica Limited

Chaleur Silica Limited operates a quarry located approximately 6.5 km northeast of Bathurst in a silica rich sandstone band in the extensive Clifton Formation. Reserves are estimated to be in excess of 600,000 tonnes of 95% SiO_2.

The property was originally explored by East Coast Smelting and Chemical Company Ltd. in the early sixties and a quarry was opened by Worldwide Explorations in 1974. In 1976, the quarry was purchased by Godin M & E and is operated under the name of Chaleur Silica Ltd.

The quarry is operated on a seasonal basis and produced in the order of 60,000 tonnes of silica in 1982. Markets included silica flux at the Belledune lead smelter, blasting sand and silica for low alkali cement production by Canada Cement LaFarge Limited in Havelock.

In 1982, Chaleur Silica Limited drilled 5 holes on a mining property adjacent to the Nepisiguit River. Results were encouraging and indicate several million tonnes of silica or similar grade to that presently produced at Bass River.

PROPERTIES RECENTLY EXPLORED AND/OR UNDER DEVELOPMENT

LIMESTONE AND DOLOMITE

Work was reported on the following limestone and dolomite deposits:

Ketepec Limestone

On September 1, 1982 the mining licence was dropped.

Armstrong Brook Dolomite

This dolomite deposit is located about 22 km west of Bathurst, immediately north of Armstrong Brook. Recent sampling by Elmtree Resources Ltd. in 1982, who own the mineral rights, has resulted in the delineation of an excess of 2 million tonnes of high-grade dolomite.

Production of agricultural lime and construction stone is planned for 1983.

Sormony Limestone

This limestone deposit is located about 30 km west of Bathurst, adjacent to the Millstream River. Mineral rights are held by Elmtree Resources Ltd., who completed a sampling program in 1982. Results indicate an excess of 4 million tonnes of high-grade calcic limestone suitable for quicklime and slaked lime production.

A feasibility study into the construction of a lime burning kiln will be carried out in 1983.

Work was not reported on the following deposits:

Alward (McGee) Limestone
Springhill Limestone
Parlee Brook Limestone
Glebe Mines Limestone
Lorneville Dolomite
Ketepec Limestone
Elliot Road Dolomite
Elliot Road Limestone
Nauwigewauk Limestone
Windsor and Craig Brook Limestone

MANGANESE

Work was not reported on the following properties:

Woodstock Manganese
St. Leonard Iron and Manganese

POTASH, SALT

Millstream Potash-Salt

This property is located 4 km west of Apohaqui, Kings County (10 km southwest of Sussex). A drill hole (Millstream No. 1) completed in 1973 by the Department of Natural Resources penetrated about 12 m of potash-bearing salt at a depth of approximately 915 m before abandonment was caused by technical difficulties.

In May of 1980 the Province called for tenders for the right to explore and develop a salt-potash prospect at Millstream and five tenders were received. After careful evaluation the Province awarded the rights to BP Exploration Canada Ltd. Under the exploration agreement BP agreed to a 6½% royalty on all potash produced as well as a 21.1% share of the accumulated value of net cash profits after earning a discounted cash profit return on investment of 15% before deducting Federal and Provincial corporation taxes. Drilling on the property commenced in 1981.

By the end of 1982, BP Exploration Canada Ltd. had completed 9 drill holes together with a seismic and gravity program.

Plumweseep-Penobsquis Potash-Salt

This property is located 5 km east of the Town of Sussex, Kings County. Following the discovery of potash in the Plumweseep-Penobsquis area by the New Brunswick Department of Natural Resources (Plumweseep No. 1) in 1971, exploration and development rights covering a 360 km^2 reservation area were granted to the Potash Company of America in 1973. The company currently holds a 19,187.0 hectare mining lease. After a comprehensive exploration program and feasibility study, the company decided to proceed with the construction of a 5 m diameter exploratory mine shaft in the spring of 1978. The exploration shaft was completed in April of 1980 and underground exploration was completed in October, 1980. On October 27, 1980 the Potash Company of America announced that it was proceeding to production with a mine capacity of 900,000 tonnes per year. Reserve estimates indicate tonnages sufficient to support a 20- to 30-year mine life. Production is anticipated by mid-1983.

The Potash Company of America is presently sinking a production shaft and constructing a concentrator and storage facilities. Work is also under way on port handling facilities in Saint John (Fig. 18).

Figure 18. Potash Company of America mine site at Plumweseep, New Brunswick

Salt Springs Postash-Salt

The Salt Springs potash-salt deposit is located about 20 km southwest of Sussex, Kings County, and was discovered by the Department of Natural Resources in 1973. Subsequent exploration and development rights to a 120 km^2 reservation area were granted to International Minerals and Chemical Corporation. Full-scale exploration involving 22 drill holes began in 1975, and was successful in confirming sufficient ore to support a 1 million tonne per year plant for 20 to 30 years.

Despite extremely encouraging results of the drilling program, I.M.C. decided to sell the property to Denison Mines Ltd. of Toronto late in 1978. Construction of a 5 m diameter exploration mine was commenced in September, 1979 and reached a target depth of 835 m.

In December of 1980 Denison Mines Ltd. assigned a 40% interest to the Potash Company of Canada Ltd. (Potacan). Potacan is owned jointly by Entreprise Miniere et Chemique and Kali and Salz AG. Denison Mines Ltd. remains the overall development manager, with potash sales to be handled by Potacan.

Underground exploration in 1982 has blocked out over 41 million tonnes of 28.5% K_2O, sufficient for the initial 5 years of production. Together with the 22 surface drill holes, the underground work to date has established total reserves of 230 million tonnes (proven and possible). A feasibility study completed in 1982 resulted in a production decision announcement on February 7, 1983.

Production is planned for mid to late 1985 with a rated capacity of 1.3 million product tonnes annually. Employment during the peak construction phase will reach 575 persons and permanent employment at mine site and port facility will total 400.

Dorchester Potash-Salt

No further work was carried out on this prospect.

SILICA

One property had work carried out on it in 1982.

Sussex Silica

An unconsolidated high-grade silica sand deposit has been discovered about 16 km south of Sussex, immediately northeast of Cassidy Lake. The property is held by Lockhart Exploration Services Ltd. Sampling indicates 9 million tonnes proven and over 22 million tonnes indicated of silica sand containing greater than 98% SiO_2.

Laboratory testing has indicated that the silica sand could meet specifications for glass and blasting sand production with minimum beneficiation. Use as foundry sand would not appear possible due to the angular shape which would have insufficient permeability.

Plans for 1983 include market research and testing for aggregate potential for highway construction.

Work was not reported on the following properties:

Burchill Road Silica
Nantucket Island Silica
Whitehead Island Silica
West Beach-Cape Spencer Silica

GYPSUM

Intervale Gypsum

The Intervale gypsum deposit is situated immediately north of Petitcodiac between Hillgrove and Intervale. A quarry has operated there intermittently since the late 1800's. In 1950, the Intervale property was acquired by Canada Cement LaFarge Ltd. who operated the quarry on an annual basis. The property is estimated to contain over 4 million tons grading 97% $CaSO_4$ and the quarry is capable of producing 5,000 to 30,000 tons of gypsum per year as required by the Canada Cement plant in Havelock where it is used as a portland cement retarder.

Quarrying is expected to continue in the future in response to the demand for gypsum by the company.

Hillsborough Gypsum

In 1982, all mineral rights were surrendered to the province.

CHAPTER 6. CONSTRUCTION MATERIALS

Minerals produced in New Brunswick in direct support of the construction industry include sand, gravel, crushed stone, stone, cement, lime clays and shales. Many of these commodities are high bulk, low unit value and transportation cost-sensitive. In addition, operations producing these commodities are generally the first mineral-associated industries to be influenced by changes in the economic climate.

The value of construction materials produced in New Brunswick in 1982 was $39.27 million (preliminary estimate, Statistics Canada) compared to $39.77 million in 1981. The value is equal to 7.5% of the total mineral production value in the province.

CEMENT

Canada Cement LaFarge Ltd. continued to operate a cement manufacturing plant at Havelock, New Brunswick in 1982 although several shutdowns were experienced due to poor markets. The plant, which was built in 1951, was expanded in 1966 by the addition of a second kiln. In 1974 the company installed heavier grinding equipment and larger storage facilities bringing the production capacity to 315,000 tons a year.

Preliminary estimates of the production value of cement are $13.1 million compared to $15.3 million in 1981.

LIME

Lime is produced by Havelock Processing Ltd. at Havelock, New Brunswick. The company produces a high-calcium quicklime utilizing a 90 ton per day rotary kiln. Markets include mineral processing operations and pulp and paper industries both within the province and within the State of Maine. Havelock Lime Works Ltd. operates the company's crushed limestone plant which offers a range of products from agricultural limestone, crushed stone for concrete and asphaltic aggregates to finely pulverized filler material.

Brookville Manufacturing Company Ltd. operates a crushing plant producing a crushed dolomitic limestone for use as agricultural limestone, concrete and asphaltic aggregate and finely pulverized filler material. Elmtree Resources Limited of Bathurst produces crushed limestone from its limestone deposit in Gloucester County for use as a flux in mineral processing, and agricultural lime.

Preliminary estimates of the value of lime production in 1982 are $3.94 million compared to $2.94 million in 1981.

CLAY PRODUCTS

L.E. Shaw Ltd. continued to operate a brick plant at Chipman, New Brunswick using a local red shale. This plant produces facing brick, drainage tile, partition tile, radial tile and an interlocking tile.

Preliminary estimates of the value of clay product production in 1982 are $2.2 million compared to $1.42 million in 1981.

STONE

BUILDING STONE

Nelson Monuments Limited of Sussex continued to produce monuments, markers and curbing although much of the granite used was imported from Ontario and South Africa.

Alpha Enterprises Ltd. of Bathurst did not produce ashlar stone from its Antinouri Lake granite quarry during 1982.

CRUSHED STONE

Moncton Crushed Stone Company Ltd., a subsidiary of Modern Enterprises, continued to produce crushed stone at Stilesville, Westmorland County. This company also continued production of manufactured fine concrete aggregate by blending, washing -¼ inch mesh crushed stone with sand brought in from Rogersville.

Moncton Crushed Stone Company Ltd. is the main supplier of aggregate in the Moncton and surrounding areas with their products being sold to concrete and paving companies and individuals.

H.E. Carson Ltd. operated a quarry in the Stilesville area producing crushed stone and rip rap.

Acadia Crushed Stone Ltd., another subsidiary of Modern Enterprises, produced crushed stone from its plant at Gayton, Westmorland County. MacDonald's Paving and Construction Ltd. also produced crushed stone from a second quarry at Gayton.

Forbes and Sloat operated a quarry and crusher operation at Douglas, outside Fredericton.

Diamond Construction Ltd. continued to operate its quarry and crushing plant at Springhill. The material crushed is greywacke.

Brookville Manufacturing Company Ltd. of Brookville, Saint John County, and Havelock Lime Works Ltd., continued to produce crushed limestone for concrete and asphaltic aggregate.

Preliminary estimates of stone produced in 1982 are 2.5 million tonnes at a value of 10.4 million compared to 2.67 million tonnes at a value of $10.67 million in 1981.

SAND AND GRAVEL

Sand and gravel may be extracted in New Brunswick by obtaining permission of the land owner as the rights to such commodities are vested in the land owner. As such, the province controls approximately 42% of the land and permits removal of sand and gravel under a permit issued by the Minister of Natural Resources under the Quarriable Substances Act.

Preliminary estimates of sand and gravel production in 1982 (Statistics Canada figures) indicate that production was at 6.1 million tonnes with a value of $9.63 million compared to 6.3 million tonnes with a value of $9.45 million in 1981.

Figures for the quantity of sand and gravel removed from Crown lands in 1982 are accurately computed at 1.67 million tonnes at a value of $2.51 million compared to 1.67 million tonnes with a value of $1.78 million in 1981.